INSTRUCTION MANUAL FOR

MODEL No. 8030/60 (a)

SERIAL No. 7/3625

BETA ELECTRIC CORP.

NEW YORK, N. Y.

NOTE:

Please read the entire instruction manual thoroughly before attempting to operate the unit.

If this is not convenient, please read the operating instructions completely before applying power for the first time.

βeta Electric
Div. of Sorensen & Co., Inc.
New York 29, New York

ADDENDA PAGE

The 8000 Series Instruction Manual is completely applicable to the 8030/60 (a) Power Supply, Serial No. 7/3625, J.O. 2231, except in the following modifications.

1. Rate of rise - 3 to 30 secs.
2. Ripple at 5 ma - 8%
3. This unit has been specifically engineered to provide an almost "noise free" corona level. The unit was compared to a system of less than 15 uv and was found to be completely noise free. (Well within the required specification of less than 100 mv level).
4. The AC wave shape is essentially "distortion" free.

Special Note re: Pre-timed high voltage on time period.

This unit can be modified to include a means of pre-setting the time period for high voltage ON.

A timer of any desired time range can be used. The timer coil is wired in parallel with contactor K1. A normally closed timer contact is wired in series with normally closed relay contacts 2a and 5b. The timer can be used as a front panel control for convenience in time adjustments.

When the HIGH VOLTAGE ON pushbutton, S8 is operated the timer coil is energized and when the time period elapses, the timer coil pulls in and opens the normally closed contact. When this contact opens the main power contactor de-energized and the high voltage is extinguished.

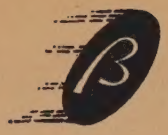
Revision to manual text on Page 9.

7: HIGH VOLTAGE CIRCUIT:

The basic high voltage circuit, on DC, is a half-wave voltage doubler. This circuit consists of transformer T85in conjunction with charging capacitor C83, rectifiers V1 and 2 or CR1 and 2 and doubling capacitor C84. The AC output is taken from the high end of T5 and the DC output from C84 via resistor R26, which limits the short circuit currents available from the supply.

8: Re note on bottom of page:

DC POLARITY REVERSING HANDLE CAN BE LEFT IN ANY POSITION DURING AC OPERATION.



BETA ELECTRIC CORP.,

NEW YORK 29, N. Y.

DIVISION OF SORENSEN & CO., INC.

INSTRUCTION MANUAL

SERIES 5000

AC/DC HIGH VOLTAGE POWER SUPPLIES

D.S. Nov. 1957

SECTION I - SPECIFICATIONS

A Electrical:

a) Input Voltage: 105-130 volts, 60 cycle, single phase (117 volt nominal).
-(2-6-1) designs: 195-240 volts, 60 cycle, single phase (220 volt nominal).

b) Input Voltamperes: 5000 VA maximum.

c) Output Voltage:

Model number denotes output voltage in kilovolts, AC peak/DC. All voltages, both AC and DC, are continuously variable from zero to maximum.

The following voltage ranges are offered:

15/30, 30/60, 50/100, 100/200, 125/250, 150/300

d) Output current: 1: 20 milliamperes ac RMS at maximum AC output voltage.
2: 5 milliamperes dc average at maximum DC output voltage.

e) Polarity (on DC): High voltage reversible with respect to ground.

f) Regulation: Approximate percentage at full voltage and load conditions.

	15/30	30/60	50/100	100/200	125/250	150/300
AC	10.3%	20%	15%		4.2%	
DC	20%	37%	25%		8.7%	

g) Ripple (on DC):

Less than .1% at rated voltage and no load. Approximately 3% to 5% at full voltage and 5 milliamperes DC.

h) Line voltage stability: No stabilization employed. Output voltage varies approximately linearly with line voltage changes.
-C1 designs: Output varies ± 1.5% for line voltage changes of ± 12%.

i) Meters: 4" square bakelite case, 5% initial accuracy for AC and 3% initial accuracy for DC. The meter is used for output voltage AC and DC and one meter for output current AC and DC.

1. Output Voltage:

Output Voltage	15/30	30/60	50/100	100/200	125/250	150/300
KV, AC PEAK	1.5/7.5/15	3/15/30	5/15/50	10/30/100	15/50/150	15/50/150
KV, DC	3/15/30	6/30/60	10/30/100	20/60/200	30/100/300	30/100/300

2. Output Current: All supplies;

0-.5/2/5 Milliamperes DC and
0-2/10/20 Milliamperes AC RMS

3. High Voltage Transformer Input:

Voltage and Current - Provision is made for metering these values by wiring into a readily accessible terminal board (TB-1) on the rear of the vertical chassis. See Dwg. #2 for location.

j) Safety features:
1. Provision for external safety interlock.
2. Interlock requiring Fine High Voltage Control to be at zero before power can be applied.
3. Automatic output voltage shorting mechanism for the power supply that reduces the output voltage to zero whenever primary power is removed. (Not supplied in all units).
4. Series resistance in output circuits limiting initial short circuit surges available from power supply.

k) Protective features:
1. Overload tripping circuit which removes input power for loads from .2 to 1.2 rated load current. (adjustable from front panel).
2. Overvoltage tripping circuit which removes input power for voltages from 10% to 120% rated output voltage. (adjustable from front panel).
3. Circuit breakers in both sides of main line.
4. Circuit breaker in input circuit of H.V. transformer.
5. Circuit breaker in control circuit line.
6. Circuit breaker in input of fine H.V. injection.
7. Circuit breaker in output of fine H.V. injection.
8. Surge suppressing gaseous discharge devices across dc meters and dc protective relaying circuits.
9. Spark gaps from high voltage transformers' primaries, to ground.
10. Spark gaps from dc metering circuits to ground.

l) Control features:
1. Adjustable rate of rise of voltage, from 6 seconds to 60 seconds to attain maximum output voltage.
2. Maximum output voltage obtainable adjustable continuously from zero to maximum output on AC or DC.

m) Controls:
1. MAIN POWER circuit breaker.
2. CONTROL POWER circuit breaker.
3. HIGH VOLTAGE OFF and OVERLOAD RESET pushbutton.
4. HIGH VOLTAGE ON pushbutton.
5. HIGH VOLTAGE TRANSFORMER INPUT circuit breaker.
6. FINE CONTROL INPUT circuit breaker.
7. FINE CONTROL OUTPUT circuit breaker.
8. HIGH VOLTAGE RAISE and LOWER pushbuttons.
9. MAXIMUM OUTPUT VOLTAGE CONTROL covat*.
10. OUTPUT CURRENT meter range selector switch.
11. OUTPUT VOLTAGE meter range selector switch.

* COVAT = continuously variable auto transformer

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12. METER POLARITY SELECTOR switch (+,-, or AC).
13. OVERLOAD TRIP RANGE SELECTOR switch.
14. OVERLOAD TRIP CONTROL rheostat.
15. OVERVOLTAGE TRIP CONTROL rheostat.
16. RATE OF RISE CONTROL covat*.
17. FINE VOLTAGE CONTROL covat*.
18. ZERO START BY-PASS pushbutton (Zero start not operable above 100KV DC).

n) Pilot lights:

a: Incandescent:
1. OVERVOLTAGE, blue.
2. OVERLOAD, yellow.
3. HIGH VOLTAGE ON, red.
4. HIGH VOLTAGE READY, green.

b: Neon:
1. MAIN POWER circuit breaker open.
2. CONTROL POWER circuit breaker open.
3. DOOR INTERLOCK OPEN.
4. EXTERNAL INTERLOCK OPEN.
5. SET FINE VOLTAGE CONTROL TO ZERO.
6. HIGH VOLTAGE TRANSFORMER INPUT circuit breaker open.
7. Motor driven COVAT AT MAXIMUM.
8. Motor driven COVAT* AT ZERO.
9. COVAT RESETTING TO ZERO.
10. FINE HIGH VOLTAGE TRANSFORMER INPUT circuit breaker open.
11. FINE HIGH VOLTAGE TRANSFORMER OUTPUT circuit breaker open.

o) Power Connections:
1. INPUT: 3-pronged, standard recessed male receptacle.
2. OUTPUT: DC: RG/U cable from high voltage section.
AC: Anti-Corona oil filled bushing or same RG/U cable as used for DC.
3. Interconnecting Cable - 12 conductor, neoprene covered cable. See Parts list for length.
4. Ground - a) High Voltage Section: Heavy duty solderless screw lug.
b) Control Cabinet: Screw binding post.

p) Auxiliary feature: Standard 2-pronged, 117 volt convenience outlet, energized when the control cabinet is energized.

B: Mechanical:

All supplies consist of a control cabinet and a separate high voltage section. The high voltage section is usually contained in an oil filled tank. In the model 8015/30 the high voltage components are located in the same cabinet as the control section.

(a) Control Cabinet:

Size: 21-3/4" wide x 36-1/4" high x 18" deep.
Weight: Approximately 125 to 150 pounds.
(for 8015/30 - pounds including high voltage components.)

* See note Page 3

Finish: 1. Cabinet: Charcoal grey.
2. Panel: Silver

b) High Voltage Section:

Size and weight are given on parts placement dwg. #2.

Finish: 1. Tank: Charcoal grey
2. Cover & Frame: Silver

c) Oil Requirements: Use high grade, 25kv test, transformer oil. See dwg. #2 for number of gallons required.

SECTION II - - - GENERAL

a) The Beta Electric Series 8000 AC and DC high voltage power supplies has been specifically designed to provide a rugged, reliable, compact, convenient-to-use and readily serviceable source of high voltage, for shop testing, laboratory use and field testing of electrical cables, high voltage rotating equipment, transformers, insulating material etc.

b) Mechanical ruggedness is stressed throughout. The frame supporting the high voltage components is of heavy angle iron. The unit can be subjected to the usual lifting and setting-down shocks encountered in this type of handling, without any adverse effects.

c) The equipment is simple to operate; shop personnel can be trained to handle the tester in a few minutes.

d) Safety and "fool-proof" designs are incorporated as far as is economically practical to render the unit safe to use even in the hands of inexperienced shop help. Some of the more important features are the following:

1. The control system is so designed as to make it impossible to have high voltage at the output accidently. The motorized covat automatically resets itself to zero after an overvoltage, an overload or when the OFF button is pushed. The ZERO START BYPASS circuit allows for surging on high voltage suddenly, but this can be done only under controlled conditions.

2. Pilot lights are used extensively to indicate all proper functioning of the power supply. In addition, pilot lights indicate all unusual conditions, such as open circuit breakers, open interlocks, etc.

3. An overload relay trips off high voltage power, by opening the primary leads, in case of load currents exceeding the overload trip adjust setting. In case of sudden load failure or flashover, the tripping time is approximately 2 cycles. An overvoltage relay also trips off high voltage power, when the output voltage exceeds the overvoltage trip adjust setting.

e) In order to render the unit flexible for all types of testing, the following features are included:

1. The rate of rise of output voltage is controlled automatically over a wide range of kv/sec., and in addition, the output voltage may be varied step by step manually.

2. The time of rise may be controlled, from 6 seconds to 60 seconds, from zero to the maximum voltage selected.

   The rate of rise may be controlled within this range to meet ASTM standards.

3. Further, the MAXIMUM output voltage available from the tester may be adjusted continuously from zero to maximum on dc and ac, so that on the low kv meter scale, uniform control of the indicated output voltage, from zero to full scale, in at least 100 steps, is available.

4. A fine control is included, that allows the output voltage to be adjusted manually to 0.03% of full scale, at any output voltage.

* *

SECTION III - - CONSTRUCTION DETAILS

Series 8000 Power Supplies are in two sections:

1. The control panel and chassis, mounting all manually controlled switches, all meters, pilot lights, controls, etc. are enclosed in a cabinet.

2. The oil-filled tank that contains the high voltage section and its associated components.

   Connections are made to the tank via "AN" connectors from the control section.

   (In the Model 8017/30, the high voltage section is located in the control cabinet).

* *

SECTION IV - - THEORY OF OPERATION

All of the circuits and functions of the power supply are quite straigh-forward, and can be readily understood by reference to the basic schematic circuit diagram, drawing #1 herewith.

Main ac power and dc circuits are indicated heavily. Light lines represent circuits for controls, meters, filtering or indicating devices. The detailed parts list herewith describes the function of each component, and the standard parts booklet, at the end of the manual, contains an explanation of circuit symbols.

Major, or unusual circuit features, are described below:

1. Neon pilot light illuminating resistors:

Resistors such as R2 ensure illumination of adjacent neon pilot light in case of open circuit breaker or open switch paralleled by the neon light, and open circuit beyond the resistor.

2. Overload holding relay K3:

When the HIGH VOLTAGE ON pushbutton, S8, is depressed, and the high voltage contactor K1, with its holding contact, 1a, pulls in, the auxiliary relay K83 operates, causing K3 to pull in when the HIGH VOLTAGE ON pushbutton is released. With contact 83b open, I11, OVERLOAD, does not shine. An overload causes relay K3 to close, opening contact 2a, causing K1 and K83 to drop out, removing high voltage power. Holding contacts 3a and 3c maintain K3 energized, and the OVERLOAD pilot light shines through contact 82b. Open contact 3b prevents application of high voltage.

To reset, pushbutton S6, OVERVOLTAGE OR OVERLOAD RESET, must be depressed.

3. High Voltage generating circuits:

The output of the high voltage transformer T2 is determined by the settings T1 and T81. The setting of T1, MAXIMUM OUTPUT VOLTAGE CONTROL, on the control panel, determines the maximum input voltage that can be applied to the input of T2 when T81 is at maximum output. T81 is motor-driven at a rise time varying from zero to maximum output, variable from 6 seconds to 60 seconds by means of T83, RATE OF RISE CONTROL.

4a. Covat motor-drive zero start holding relay:

When power is first applied, if S84, the lower limit switch of covat T81 is not at zero, it can be traced that power will flow through the coil of relay K82, thus closing contacts 82a and 82b, energizing the armature of R81 in a direction to LOWER the output of T81. During this process, I81, COVAT RESETTING TO ZERO , is illuminated through contact 85C.

When S84, is thrown to the AT ZERO position, K84 is energized, closing contact 84a energizing K85 and maintaining K85 energized via contact 85a, even with subsequent opening of K84 when S84 subsequently moves away from zero. Contact 85b closes, applying control power to the HIGH VOLTAGE ON pushbutton S8, through S16, the zero start interlock on the fine high voltage control covat T2, and relays K83, K1 and K88.

It is to be noted that during this ZERO RESETTING cycle, while K87 is still un-energized, that CR81 has full line voltage, plus 24 volts from T82, applied to it, driving B81 down very rapidly.

4b. Slow down Circuit: Resistor R24 in conjunction with the incandescent lamp I14, constitute a slow down circuit to prevent high voltage surges from appearing in the secondary circuit of the high voltage transformer T5, when primary power is suddenly applied. Before primary power is applied to T5, and simultaneously across I14, the resistance of I14 is comparatively low, less than the resistance of R24. Therefore, the voltage across the primary of T5 will be less than 1/2 line voltage, even if T1 is at the maximum output position. It takes several cycles for I14 to warm up to operating temperature, at which condition, its "hot" resistance is almost 20 times its "cold" resistance.

Therefore, at the steady state the presence of I14 affects the output voltage only slightly. But its effect in reducing starting surges when primary power is first applied increases the life of the high voltage transformer considerably, and eliminates the possibility of voltage overshoot.

5. High voltage RAISE-LOWER circuits:

Motor B81 drives T81 UP, for greater output voltage, with contacts 81a and 81b of K81 closed, or DOWN, for lower output voltage, with contacts 82a and 82b of K82 closed.

It can be seen that S81 and S82, operating K81 and K82 respectively, have "back contacts", preventing simultaneous operation of K81 and K82.

It is further to be seen that there are pilot lights that indicate COVAT AT MAXIMUM and COVAT AT MINIMUM, when the limit switches S83 and S84 are operated.

Finally, with K87 closed, T83 controls the speed of B81, and hence the rate of rise of the output voltage. T83 ensures that the driving voltage for B81 will never be low enough to stall the motor.

6. SURGE TEST CIRCUITS (switch S7, relay K86):

Surge not operable in units of above 100kv DC output.

A. In order for it to be possible for high voltage to be thrown on suddenly, the following conditions must prevail:

(a) contact 88b must be closed, i.e., high voltage contactor K1 must be open, or the condition must be HIGH VOLTAGE OFF.

(b) contact 87a must be closed, i.e., the motorized covat T81 have returned to zero.

B. With conditions 6A(a-b) fulfilled, the ZERO START BYPASS circuit is operable. This means that K86 will be energized if S7, ZERO START BYPASS, is pressed. With K86 energized, contact 86a closes, allowing S81, RAISE, to energize K81 through S83 (remember that T81 is near zero, and hence S81 is OFF MAXIMUM), driving B81 so as to raise the output of T81. S10 must be maintained depressed during this operation. If it is released the T81 will automatically reset to zero.

C. At any voltage up to 100 kv dc, with S7 depressed, and S16 at zero, high voltage may now be thrown on by depressing S8, HIGH VOLTAGE ON.

D. It should now be noted that if, at any time during the process of surge testing and PRIOR TO DEPRESSING the "HIGH VOLTAGE ON" push-button, the ZERO START BYPASS pushbutton is released, then not only is K86 de-energized through S84 (away from zero), normally closed contact of the 88a un-energized high voltage holding relay K88 (remember that high voltage is NOT on), and the "back contact" S7b of S7, thus driving the covat T81 down to zero. The return to zero is at a rate determined by the setting of T83, as K87 had previously been pulled in, and drops out only after an overload, overvoltage, or S2, HIGH VOLTAGE OFF, being depressed.

E. The cut-out near the top of the control panel is there so that the operator can check the position of the motorized covat. This will show to what voltage the unit will surge into when the ZERO START BYPASS is used. The output varies directly with the covat dial setting in percent of output voltage.

7. High Voltage circuit:

The basic high voltage circuit is a half-wave voltage doubler. This circuit consists of transformer T5 in conjunction with charging capacitor C83, rectifiers V1 and 2 or CR 1 and 2 and doubling capacitor C84. The AC output is taken from the high end of T5 and the DC output from C84 via resistor R26, which limits the short circuit currents available from the supply.

8. Polarity Reversal on DC: (See Note Below)

DC polarity reversal is effected by reversing the sense of the rectifiers. This reversal is made by changing the position of the lucite reversing handle located in the high voltage section. This handle can be reached through a port-hole in the tank top and polarity can be reversed while the frame is immersed in oil.

For Model 8015/30 polarity is reversed by inter-changing two leads. The leads are located on a lucite shelf near the top of the cabinet. The cabinet top is removable for reversing.

Refer to the parts placement dwg. #2 for location of reversing jacks and plugs.

NOTE: POLARITY REVERSING HANDLE MUST BE SET FOR NEGATIVE POLARITY WHEN UNIT IS USED FOR AC OPERATION.

9. Metering Circuits:

The output voltage metering circuit consists of resistor R12 in series with meter M1, OUTPUT VOLTAGE, and calibrating potentiometers R15,16, and 17 for DC and R84, 85 and 86 for AC.

It is to be noted that the return of this metering circuit is not to ground, but to the "high" end of the output current metering circuit M2. Thus, the output current meter does not indicate the drain of the kilovoltmeter circuit. The meter reads average dc and the peak of the ac output of the high voltage transformer T5.

The output current is metered on DC by connecting the meter in series with ground. R18, 19 and 20 are the calibrating potentiometers for the DC ranges. The AC load current is metered via the Low End Return which is connected from the load. R81, 82 and 83 are the AC range calibrating potentiometers, and rectifier CR84 allows the dc meter to read in terms of AC RMS.

10. Overvoltage and Overload circuits:

The overvoltage relay V4 is in series with firing tube, V4 and paralleled by C4 and R13 and R14. Current returning from the multiplier resistor R28, causes a voltage drop across the parallel circuit. When the firing voltage of V4 is reached, V4 fires and capacitor C7 discharges into K4. When K4 pulls in contact, 4a closes, energizing relay K 5 and de-energizes the high voltage circuits. Pilot light I11, overvoltage, will shine indicating an overvoltage condition, and Covat T81 will automatically reset to zero. The overload relay, K2, is in series with the output current meter, M2. This relay is separately calibrated for Dc and AC operation through switch, S13. When K2 pulls in contact 2a opens and immediately de-energizes the high voltage circuits. K83 drops out and contact 83b closes causing pilot light I10, overload, to shine. Covat T81 automatically resets to zero.

* *

SECTION V - - OPERATING INSTRUCTIONS

A: Mechanical:

1. Remove the tank cover and the frame-mounted components from the tank.
2. Check the tank interior for visible damage. Note the following:

   a. whether all connections from the high voltage transformer output are in place.
   b. no high voltage resistors are chipped; check the resistor values referring to drawing #2 for parts placement and #3 for values.

REPORT ALL DAMAGE (DETERMINED FROM VISIBLE INSPECTION AND FROM SUBSEQUENT ATTEMPTS TO PUT THE POWER SUPPLY INTO OPERATION) TO THE CARRIER AT ONCE. PLEASE SEND A COPY TO BETA ELECTRIC DIV.

THE POWER SUPPLY WAS IN PERFECT OPERATING CONDITION BEFORE IT WAS SHIPPED FROM THE BETA ELECTRIC FACTORY; ANY MALFUNCTIONING UPON ARRIVAL AT YOUR PREMISES IS DUE TO DAMAGE OCCURRING IN SHIPMENT.

3. Fill the tank with high grade transformer oil, at least 25 kv test, to within 2-1/4" from the tank top, to the stamped line in the tank interior.

4. Lower the frame slowly into place, at about 1" per second, to minimize aeration and splashing of the components and oil.

5. Bolt the cover to the flange by means of the bolts removed in step (1). Use a small hand wrench, and do not tighten excessively.

6. Check that all circuit components are solidly in place on the panel, and on the chassis. Ascertain that all plug-in relays are firmly in their sockets, and that the base clamps are snapped shut.

NOTE: The door interlock switch is of the type that does NOT REQUIRE THE USE OF EXTERNAL JUMPERS FOR BY-PASSING, while the power supply is being serviced. The plunger closes the switch in the "pulled-out" as well as the "pushed-in" position.

7. Connect the output to the load.

8. Wire an interlock, closed in the SAFE position, across pins "a" and "d" of the plug that mates with the socket, on the chassis rear, labelled FOR EXTERNAL INTERLOCK. (A terminal board may be supplied instead of the "AN" connector).

B. ELECTRICAL:

1. ALWAYS OPERATE WITH A GOOD EXTERNAL GROUND. Before any other connections are made, the overpotential tester frame should be grounded by means of the ground post on the rear of the chassis. Bare wire, of at least #14 gauge, should be used.

2. Wire up the 3-wire connector to a 117 volt, single phase, 60 cycle system. The center pin should be connected to ground. The other two may be connected arbitrarily.

3. Set the OUTPUT VOLTAGE and OUTPUT CURRENT meter range selector switches to the anticipated most useful ranges.

NOTE: The meters are protected against overloads on all ranges, so an incorrect range selection will not result in meter damage.

4. Set the +, -, or AC selector switch, for AC operation SET REVERSING HANDLE FOR NEGATIVE.

5. Set the MAXIMUM OUTPUT VOLTAGE CONTROL to the dial reading corresponding to the maximum output voltage desired. See drawing #4 for this calibration.

6. Set the RATE OF RISE CONTROL to the value corresponding to the desired time to attain the maximum voltage set in (5). The total time is variable from 6 seconds to above 60 seconds. The calibration of the control setting can be seen from drawing #7.

7. Set the OVERLOAD TRIP CONTROL and OVERVOLTAGE TRIP CONTROL to the setting corresponding to the current and voltage at which it is desired to trip the overload or overvoltage relay. Refer to drawing #6 and 5 respectively, for these calibrations.

8. Throw the MAIN POWER breaker to ON.

9. Throw the CONTROL POWER breaker to ON. The green pilot light, I12, HIGH VOLTAGE READY , should shine.

10. Depress the HIGH VOLTAGE On black pushbutton. If the power supply has not been properly "set-up", a neon pilot light will shine. Correct the situation indicated by the illuminated neon pilot light.

11. Depress the RAISE pushbutton, noting the output voltage meter readings, as indicated; the meter may be turned from range-to-range at any point, without damage to movement.

12. TO TURN OFF: Depress the HIGH VOLTAGE OFF pushbutton.

13. TO RESET AFTER AN OVERLOAD or, an OVERVOLTAGE.

The motorized Covat* will automatically reset to zero after an overload or overvoltage.

1. Remedy the overload condition and depress the HIGH VOLTAGE OFF pushbutton.
2. Proceed as per steps 4 through 9, above page.

14. TO APPLY HIGH VOLTAGE SUDDENLY-ZERO START BY-PASS circuit:

a. Repeat steps 1 through 9 above.
b. Depress the ZERO START BY-PASS pushbutton.
c.1. Watch the motorized covat through the cutout in the front panel and when it reaches the desired setting; maintain the ZERO START BY-PASS pushbutton down and,
2. Depress the HIGH VOLTAGE ON pushbutton.
d. The high voltage will now have been applied suddenly to the load.

SECTION VI - - PRECAUTIONS

1. ALWAYS OPERATE WITH GOOD EXTERNAL GROUND; if this is not done unexpected high voltages may appear on the frame in case a highly capacitive load fails at elevated potential tests. Bare wire is recommended, at least #14 gauge.

2. KEEP ALL OPERATING PERSONNEL AT LEAST TWO FEET FROM THE OUTPUT TERMINAL. A very dangerous shock can be obtained with test voltages greater than 10 kv.

3. DO NOT JAR THE UNIT UNNECESSARILY. Although this OVERPOTENTIAL TESTER is built very ruggedly, the presence of meters, relays and other electronic components requires reasonable care. This unit should NEVER be "dropped" from a lifting crane more than 2".

* * * *

"EXTERNAL INTERLOCK OPEN"
"HIGH VOLTAGE TRANSFORMER BREAKER OFF"
"CONTROL POWER"
"DOOR INTERLOCK OPEN"
"MAIN POWER"
"HIGH VOLTAGE TRANFORMER INPUT"
"HIGH VOLTAGE OFF"
"OVERVOLTAGE OR OVERLOAD RESET"
I1
I2
I6
I7
I3
S1a
S2
S9
S3
S6
S7b
"115 VOLTS AC INPUT"
J1
J2
J3
J4
R1
R7
R2
R3
R10
4a
6a
83a
3a
5c
83b
3a
I10
BLUE
K5(C)
I11
YELLOW
K3(c)
E12
S1b
"ALWAYS OPERATE WITH GOOD EXTERNAL GROUND"
"AUX 115 VOLT AC OUTLET"
"FOR EXTERAL INTERLOCK"
OVERVOLTAGE
OVERLOAD
"RATE OF R
1c
1b
"HIGH VOLTAGE ON"
T6a
T6b
Y Y X X
"MAXIMUM OUTPUT VOLTAGE CONTROL"
T3
S3 coil
R24
S13 J
S8
J82
AC OUTPUT
E10
I13
RED
T1
T81
T84
T5
T85
C83
I14
C1
C2
T81 DRIVEN BY B81
E15
X
X
V1
R94
R95
P8d
"FINE CONTROL INPUT"
I4
"FINE CONTROL OUTPUT"
I5
S4
S5
T2

R21

R8

I9

SWITCH ON T2

"SET FINE HIGH VOLTAGE CONTROL TO ZERO"

89a

88a

"ZERO START BYPASS"

"RAISE"

"LOWER"

2a 5b

S81

S82

S7a

87b

85c

K86 (a)

S83 RAISE RELAY

K81(c)

S84

T83

87c

AM OM

OZ AZ

LOWER RELAY

I82 AT MAX.

T82

I81

88b

87a

83 c

86 a

K82 (c)

K84 (a)

I83 AT ZERO

"ZERO RESETING"

"COVAT AT MAXIMUM"

NOTE:
S83 & S84
GANGED TO T81

85b 3b

S16

O.Z.

A.Z.

LOWER LIMIT

S8

"HIGH VOLTAGE ON"

84a

85a

1a

1d

K85(c) K87(c) K89(a)

I12 GREEN

K83(c)

K1(d)

K88(b)

"HIGH VOLTAGE READY"

R93

82c 82b

CR81

81a

81c 81b

82a

B81

ARM

FIELD

CR82

SWITCH ABBREVIATIONS

AZ = AT ZERO
OZ = OFF ZERO
AM = AT MAXIMUM
OM = OFF MAXIMUM

E11

R96 R97

CR1

CR2

INTERLOCKED WITH AC POSITION ON S13

K90(a)

K91(d)

S85

J8a

J8c

J8d

J8b

K8

P8a

P8c

R29

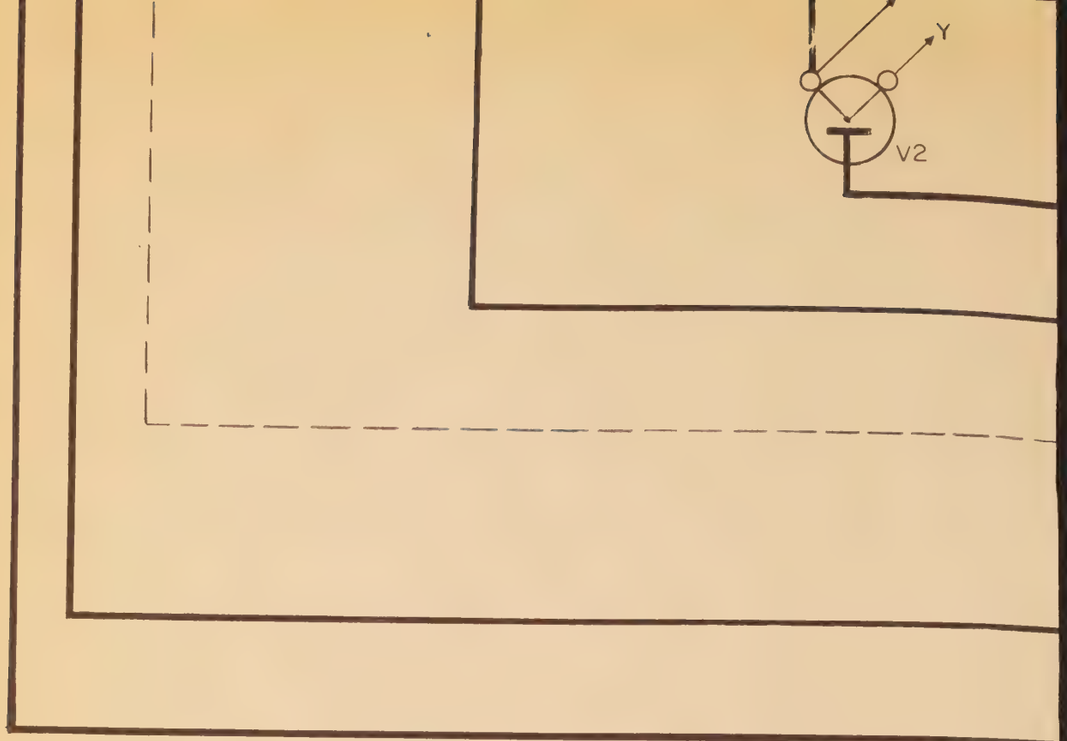
R26

J7

P7

W3

"FINE HIGH VOLTAGE CONTROL"



= POT WITH MECHANICAL STOP SET FOR MINIMUM RESISTANCE; APPROXIMATELY 10% OF MAXIMUM.

LETTERS IN PARENTHESES FOLLOWING "K" NUMBERS INDICATE LAST RELAY CONTACT USED i.e. K3(c)

"OU

P8b

C84

R94

E14

R91 R22 R92 R23 C6

ac dc S13g ac S13h dc V6

K2(a) CR83

S13f ac dc

E13

91a

90a

"OVERVOLTAGE TRIP CONTROL"

S13a S13b

R13 CW R14

C4 V4 K4(a)

91b

91c

91d

V3 R12 C3 M1 S13c

R15 R16 R17 "6" "30" "60" S11a

R84 R85 R86 "3" "15" "30" S11b

"OUTPUT VOLTAGE"

"FULL SCALE KILOVOLTS"

"METER RANGE SELECTOR"

"METER SHORTED"

"PUT CURRENT"

M2

R18 R19 R20 C5 V5

".5" "2" "5" S12a

S13d S13e R11

R89 R90 C82 C81 CR84

R88

R81 R82a R82b R83 "2" "10" "20" S12b

R87 J81 E6 V81

"AC LOW END RETURN"

DC RETURN

"METER SHORTED"

"FULL SCALE MILLIAMPERES"

"METER RANGE SELECTOR"

NO.	REVISION	BY	DATE
1	T85 PLUS ASSOCIATED CIRCUITRY ADDED	DS	5 22 58

SCHEMATIC CIRCUIT DIAGRAM

DIMENSIONS IN INCHES DO NOT SCALE

DRAWN BY FR 11-20-57

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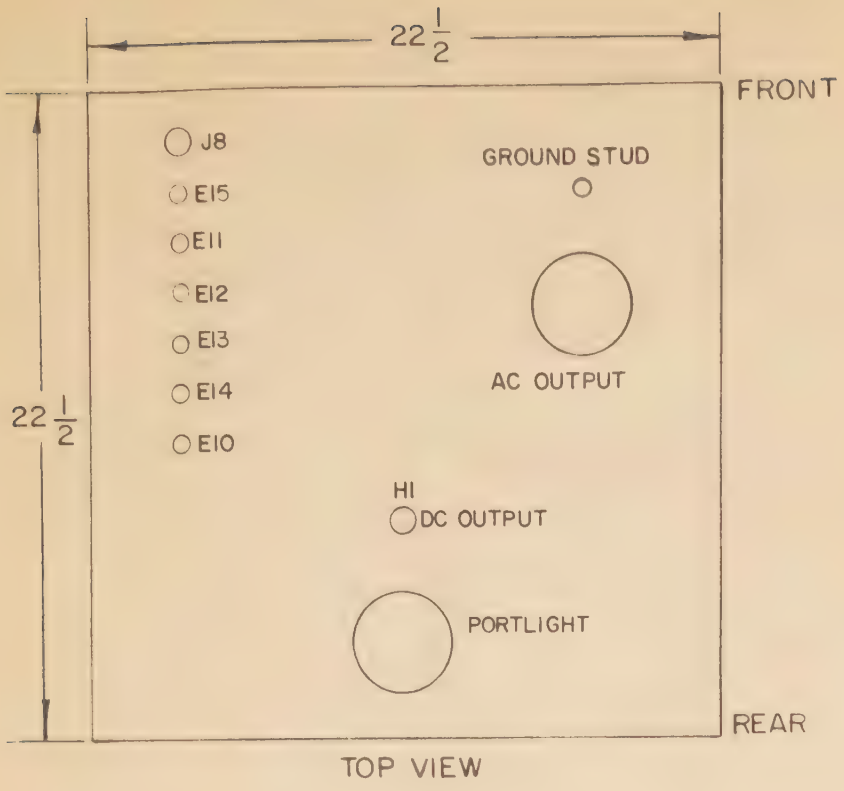
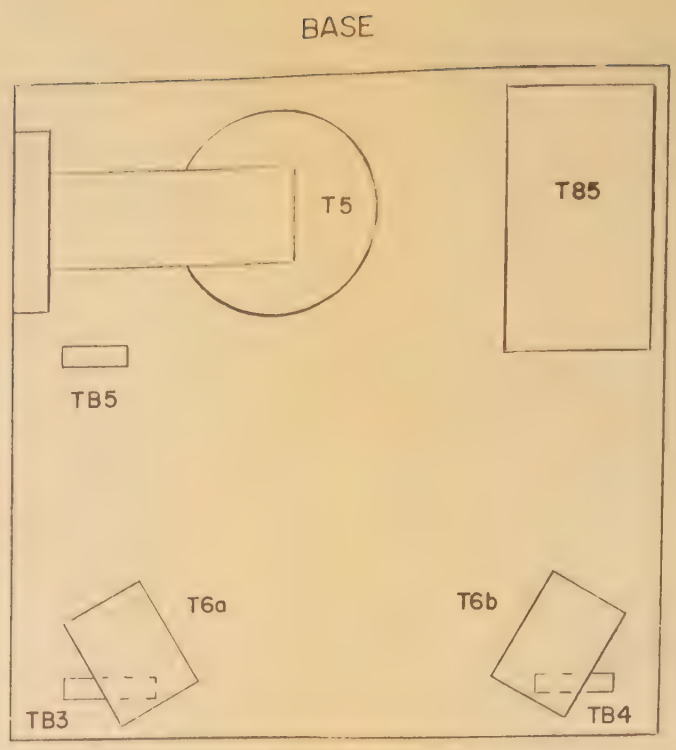
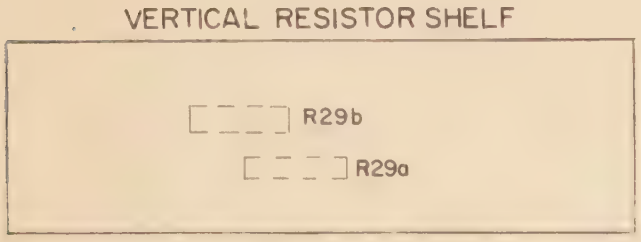
8030/60(a)-1
(REVISION #1)

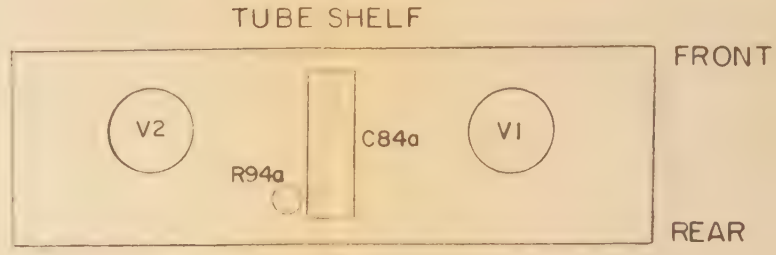


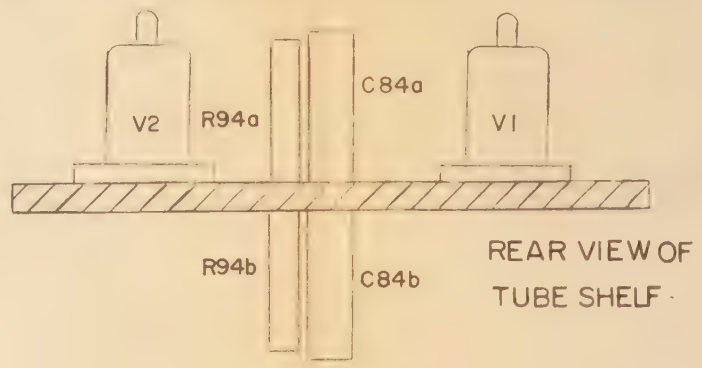
TOP VIEW

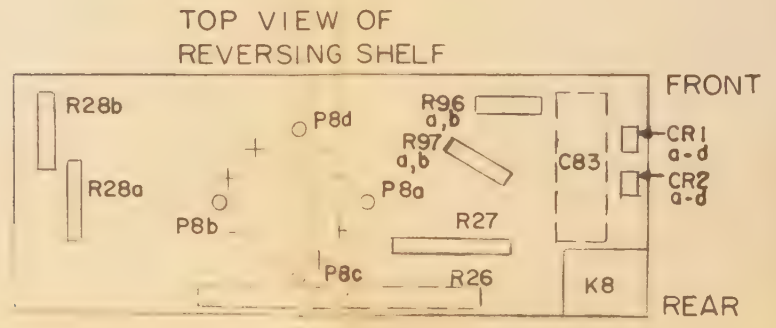


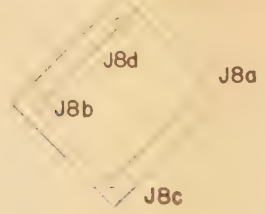
TOP VIEW









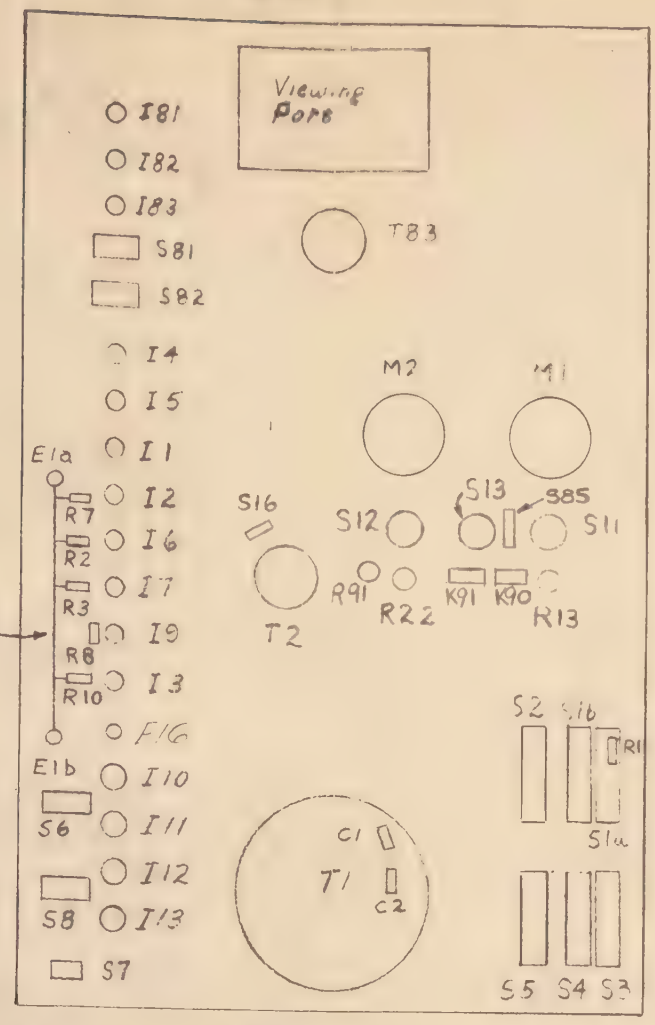


HIGH VOLTAGE TANK

MECHANICAL SPECIFICATIONS	
TANK	$22\frac{1}{2}$" X $22\frac{1}{2}$" X 27"
HEIGHT WITH BUSHING	40"
HEIGHT WITHOUT BUSHING	33"
WEIGHT WITH OIL	1000 LBS.
WEIGHT WITHOUT OIL	600 LBS.
OIL REQ'D	50 GALS.

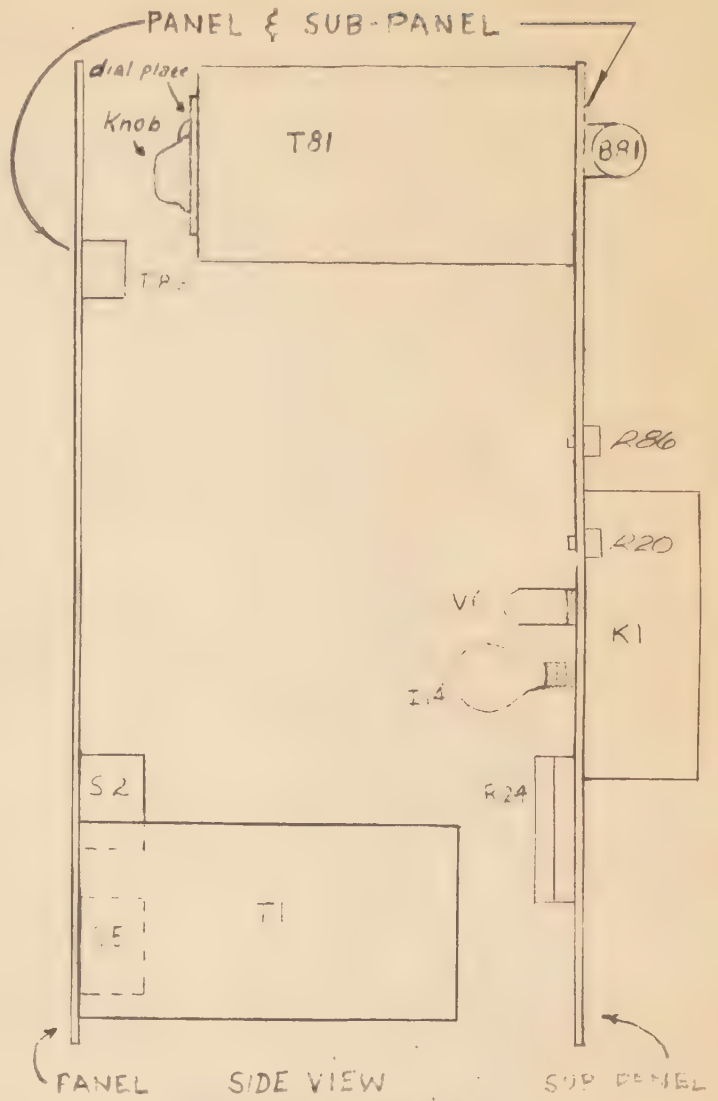
PANEL & SUB-PANEL

PANEL

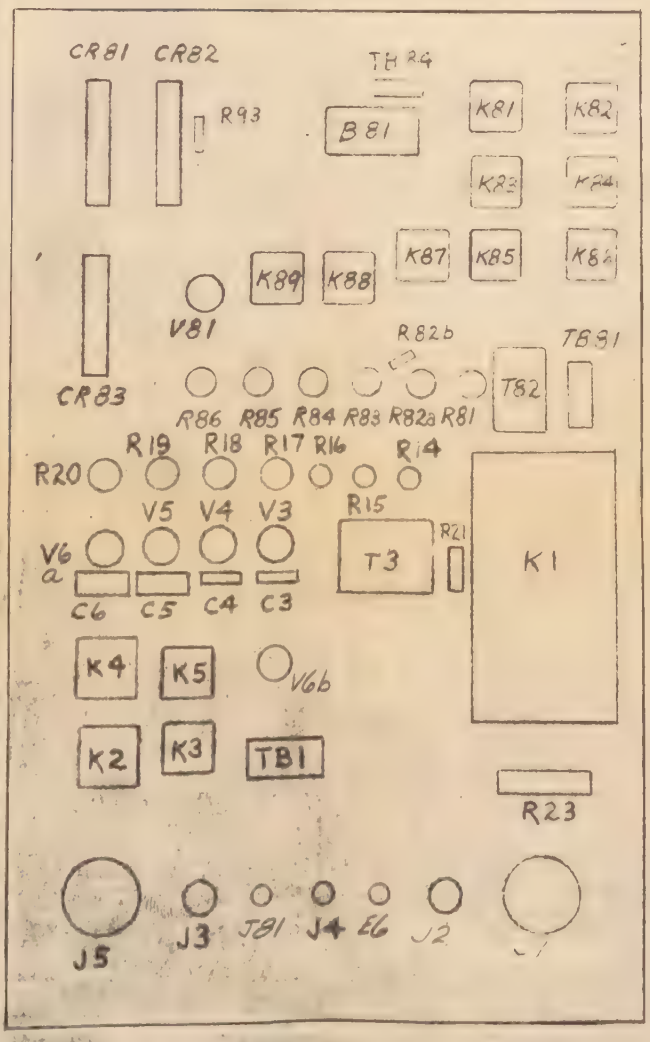


REAR VIEW
(AS SEEN FROM REAR OF CABINET)

PANEL & SUB-PANEL

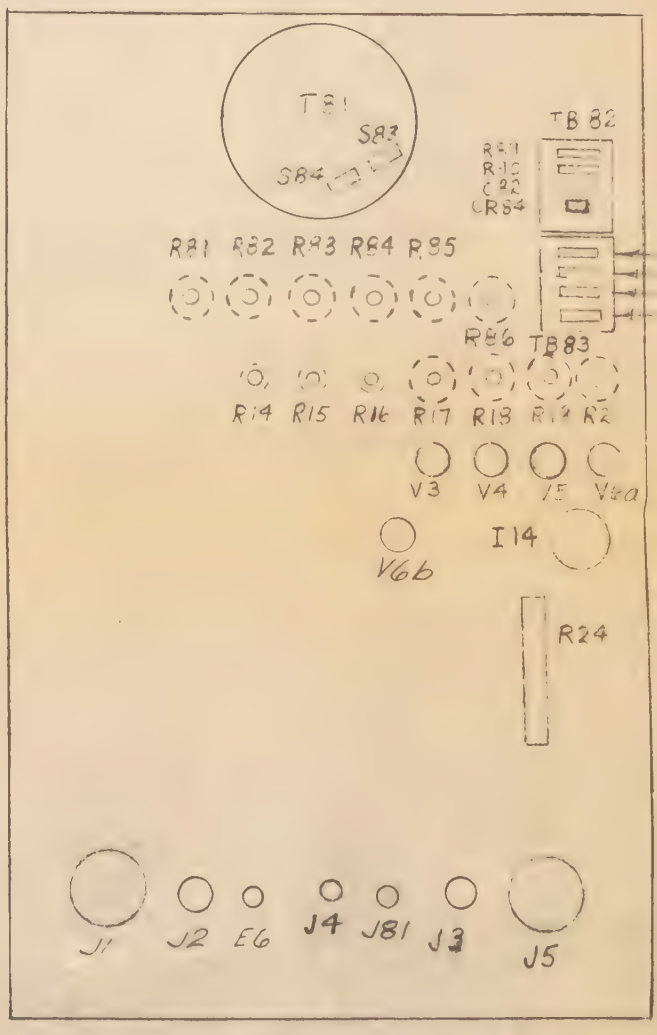


SUB PANEL



REAR VIEW
(AS SEEN FROM REAR OF CABINET)

SUB PANEL



FRONT VIEW
(AS SEEN FROM FRONT OF CABINET)

NO.	REVISION	BY	DATE
1	REVISED PER DRAWING #1	DS	5-26-58
C			
B			

PARTS PLACEMENT

DIMENSIONS IN INCHES
DO NOT SCALE

DRAWN BY FR 11-22-57

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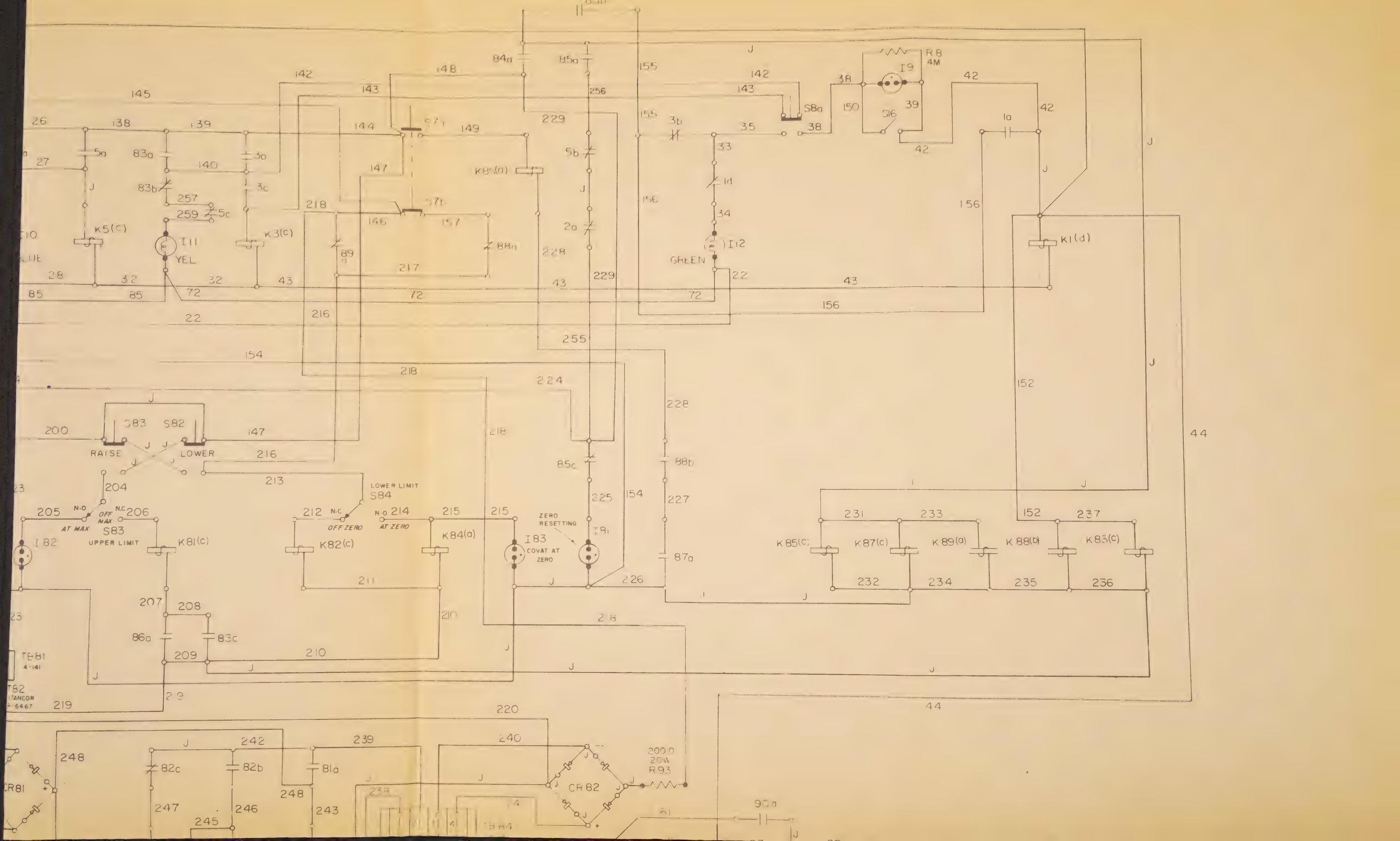
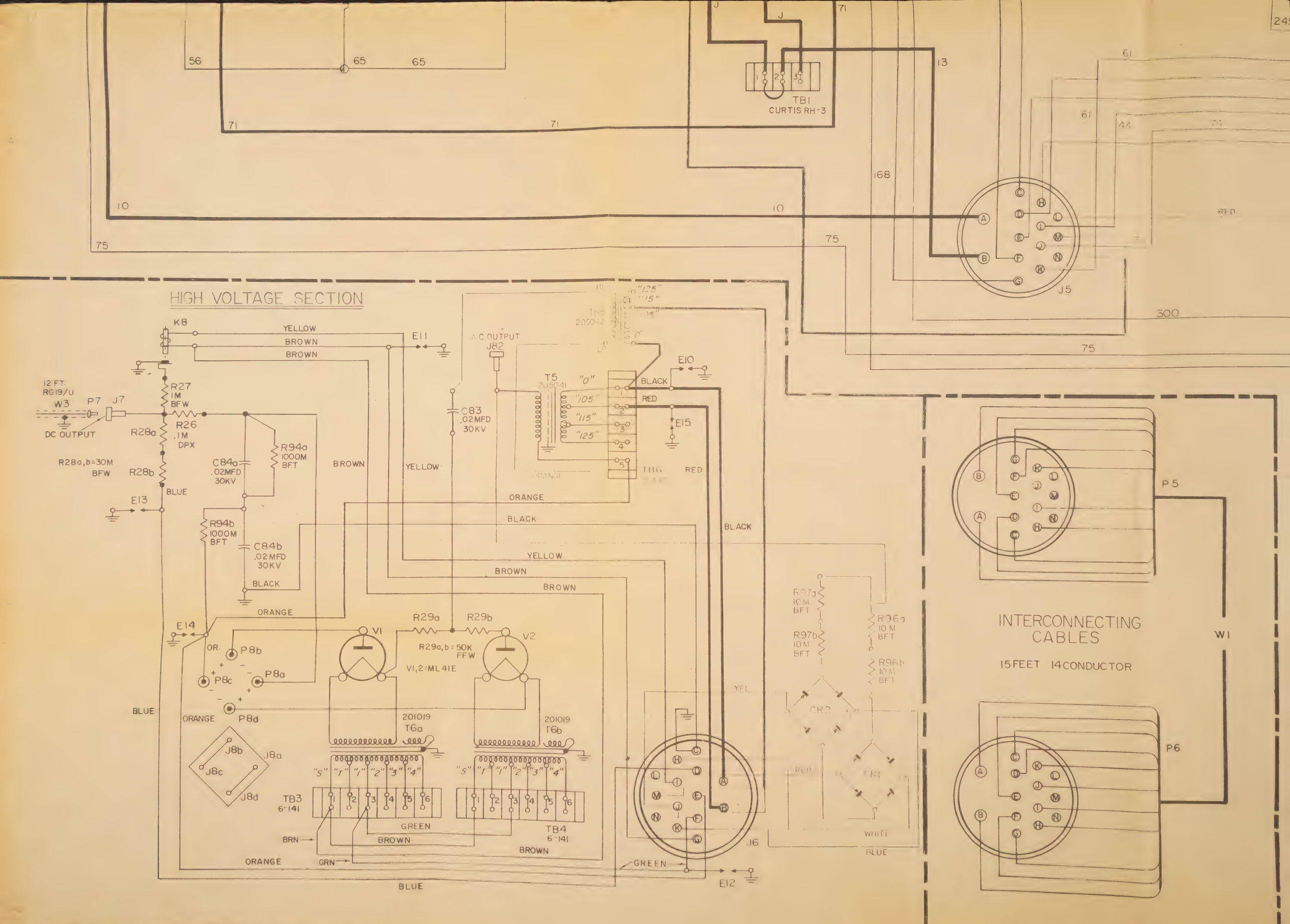
APPR'D BY 12/57

BETA ELECTRIC
DIV. OF SORENSEN & Co INC
NEW YORK 29, N.Y.

C 8030/60(9)-2
(REVISION #1)

I1
I2
I6
I7
I3
R21
5K, 5W
51
15A
S1a
52
63
3A
S2
66
70
S9
121
102
15
J3
16
67
10A
S3
68
145
S6
19
49
49
2
J
62
J
J1
J2
89
75
J4
R1
100K
6
J
J
J
J
J
J
J
J
R7
100K
R2
100K
R3
100K
R10
100K
BUSS BAR
E1a
E1b
28
22
154
15A
S1b
1
90
1c
5
10
4
I13
RED
3
1b
6
18
18
S8S
K91d
K90a
J
J
135
53
T1
TYPE
V-10
135
T81
TYPE
V-10
137
C1
C2
C1,2=.01MFD
600V
4
36
75
71
200
T83
TYPE 10
87b
87c
201
222
202
222
221
220
221
203
203
I4
I5
54
55
1.5A
S4
59
60
1.5A
S5
53
57
58
58
64
T2
TYPE 10
65
"0"
"109"
7/16"
UTC S-53
T3
64
S3 coil
9
R24
0.11Ω
200W
118
N.C
S8b
N.O.
12a
S13
12
119
I14
168
T84
UTC R46
120
120
300
300
18
90


R8 4M
I9
S8a
S16
1a
K1(d)
I12
GREEN
3b
1d
2a
5b
84a
85a
256
155
142
143
148
145
144
149
147
146
157
218
217
228
229
156
152
44
26
27
138
139
140
5a
83a
3a
83b
257
259
5c
3c
K5(C)
K3(C)
I11
YEL
89
88a
28
32
85
72
43
22
216
154
255
224
228
88b
227
225
154
87a
85c
I81
226
K85(c)
K87(c)
K89(a)
K88(b)
K83(c)
231
233
237
232
234
235
236
S82
S83
S84
200
147
RAISE
LOWER
213
LOWER LIMIT
204
205
206
N-O
N-C
OFF MAX
AT MAX
S83
UPPER LIMIT
I82
K81(c)
212
OFF ZERO
214
AT ZERO
K82(c)
215
K84(a)
I83
COVAT AT ZERO
ZERO RESETTING
211
207
208
86a
83c
209
210
TB81
4-141
TB2
TANCOR
6467
219
23
CR81
248
242
82c
82b
81a
247
246
245
243
239
240
CR82
200Ω
20W
R93
90a
61
24
TB84


HIGH VOLTAGE SECTION
K8
YELLOW
BROWN
BROWN
E11
12 FT.
RG19/U
W3
P7
J7
DC OUTPUT
R27
1M
BFW
R26
.1M
DPX
R28a
R28a,b=30M
BFW
R28b
BLUE
E13
C84a
.02MFD
30KV
R94a
1000M
BFT
R94b
1000M
BFT
C84b
.02MFD
30KV
BLACK
ORANGE
E14
OR.
P8b
P8c
P8a
P8d
BLUE
ORANGE
J8b
J8a
J8c
J8d
R29a
R29b
R29a,b = 50K
FFW
V1
V2
V1,2=ML41E
201019
T6a
201019
T6b
"S" "T" "1" "2" "3" "4"
TB3
6-141
TB4
6-141
BRN
GRN
GREEN
BROWN
BROWN
ORANGE
BLUE
A.C.OUTPUT
J82
C83
.02MFD
30KV
T5
205041
"0"
"105"
"115"
"125"
E10
E15
BLACK
RED
ORANGE
TB6
RED
BROWN
YELLOW
ORANGE
BLACK
YELLOW
BROWN
BROWN
BLACK
J6
E12
GREEN
R97a
10M
BFT
R97b
10M
BFT
R96a
10M
BFT
R96b
10M
BFT
CR2
CR1
YEL
RED
WHITE
BLUE
J5
P5
INTERCONNECTING
CABLES
15 FEET 14 CONDUCTOR
W1
P6
56
65
65
71
71
71
J
J
TB1
CURTIS RH-3
13
168
10
10
75
75
61
61
44
74
RED
300
75

CONTROL SECTION

NOTES:

1. J DENOTES JUMPER
2. NUMBERS ON LINES REFER TO "QUIK-LABEL" CODE MARKERS ON EACH END OF ACTUAL WIRES.
3. COLORS ON LINES CORRESPOND TO COLOR-CODING OF ACTUAL WIRES.
4. NO. 20 WIRE NO. 12 WIRE
5. LETTERS IN PARENTHESES FOLLOWING "K" NUMBERS INDICATE LAST RELAY CONTACT USED I.e. K4(b)
6. * POT WITH MECHANICAL STOP SET FOR MINIMUM RESISTANCE; APPROXIMATELY 10% OF MAXIMUM

NO	REVISION	BY	DATE
1	REVISED PER DRAWING	DS	5-27-58

SCHEMATIC WIRING DIAGRAM

DIMENSIONS IN INCHES DO NOT SCALE

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NEW YORK 29, N.Y.

8030/60(a)-3
REVISION "1"

CALIBRATION CURVE

OUTPUT VOLTAGE AT NO LOAD
VS.
HIGH VOLTAGE CONTROL SETTING

Beta Electric Corp.
NEW YORK 29, N.Y.

β - 8030/60(0)-4

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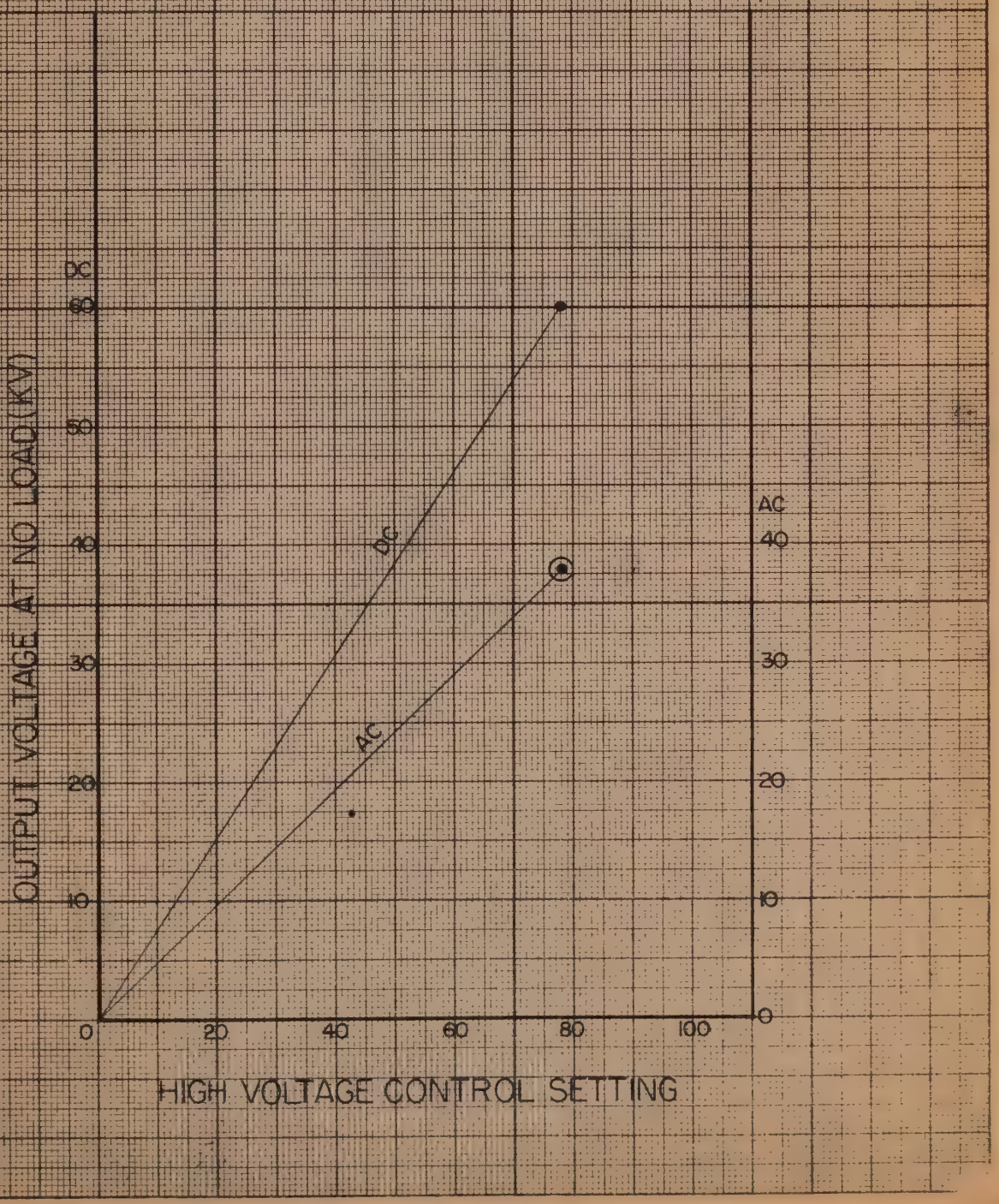
CKD. BY
APP'D. BY

NOTE:
LINE VOLTAGE = 117 V



EUGENE DIETZGEN CO.
PRINTED IN U. S. A.
NO. 340-A M DIETZGEN GRAPH PA
MILLIMETER

OVERVOLTAGE CALIBRATION CURVE

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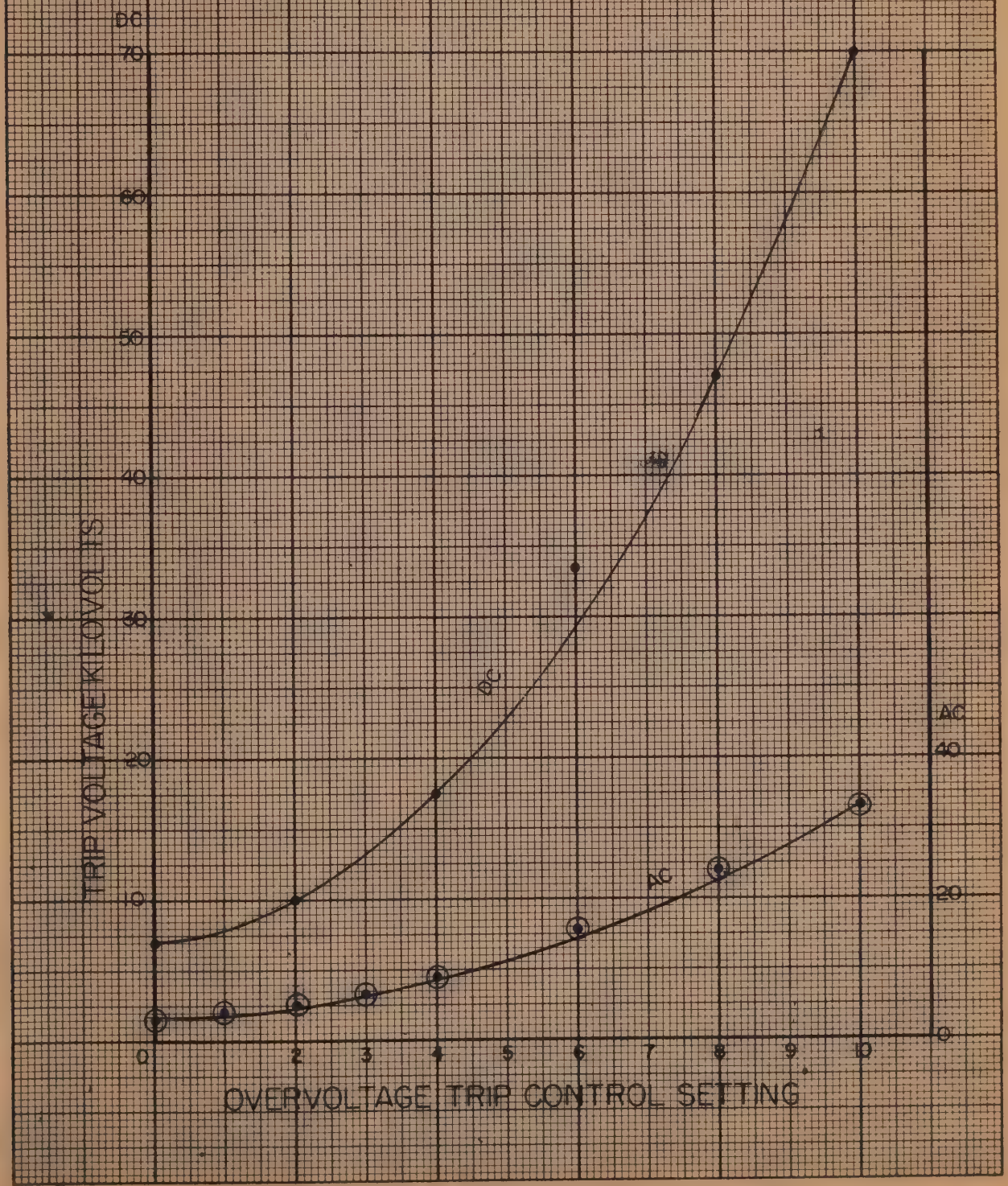
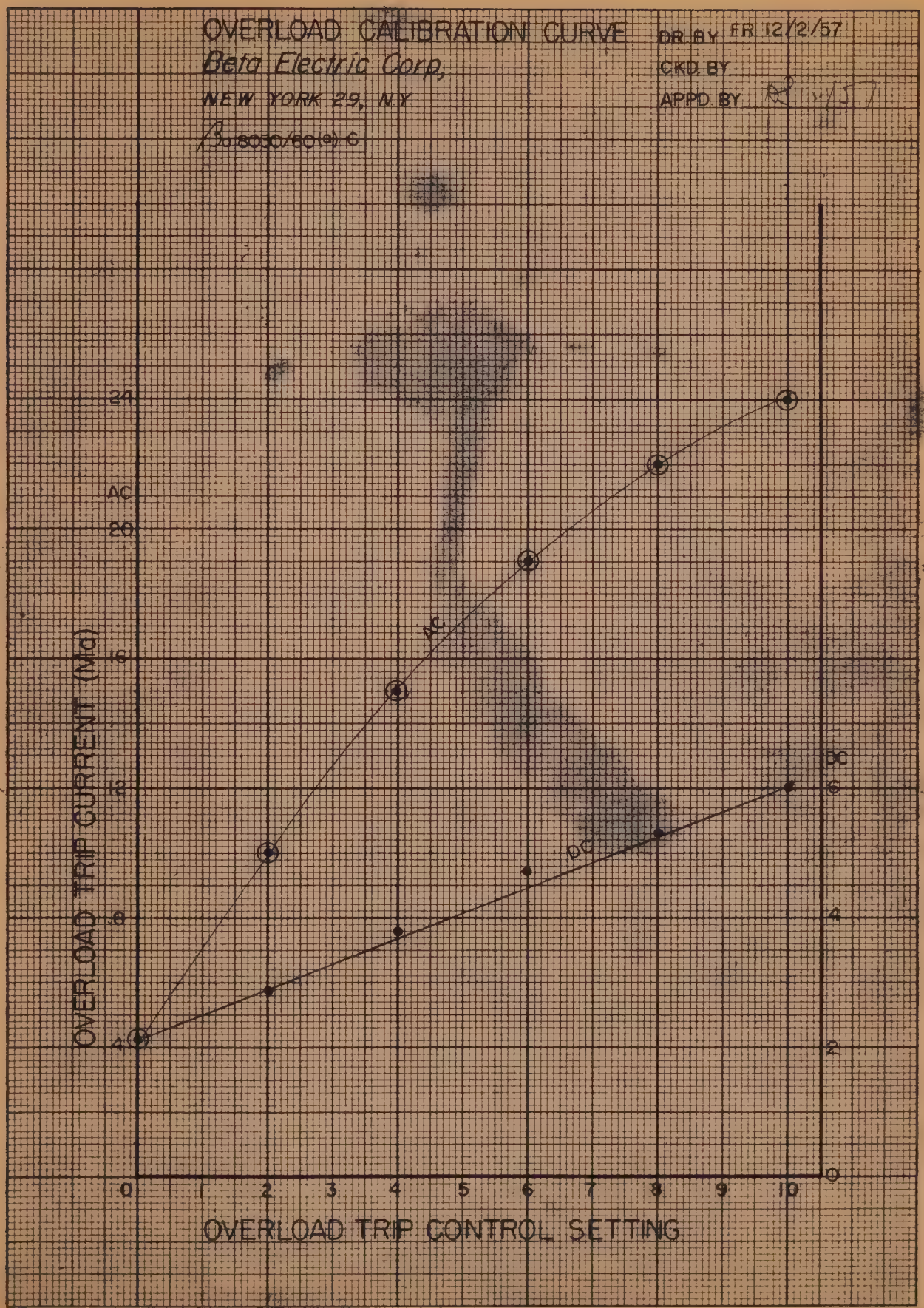
NEW YORK 29, N.Y.

DR. BY FR 11-25-57
CKD. BY
APP'D. BY

β_c 8030/60(9)-5



EUGENE DIETZGEN CO.
MADE IN U. S. A.
NO. 340Á .20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH



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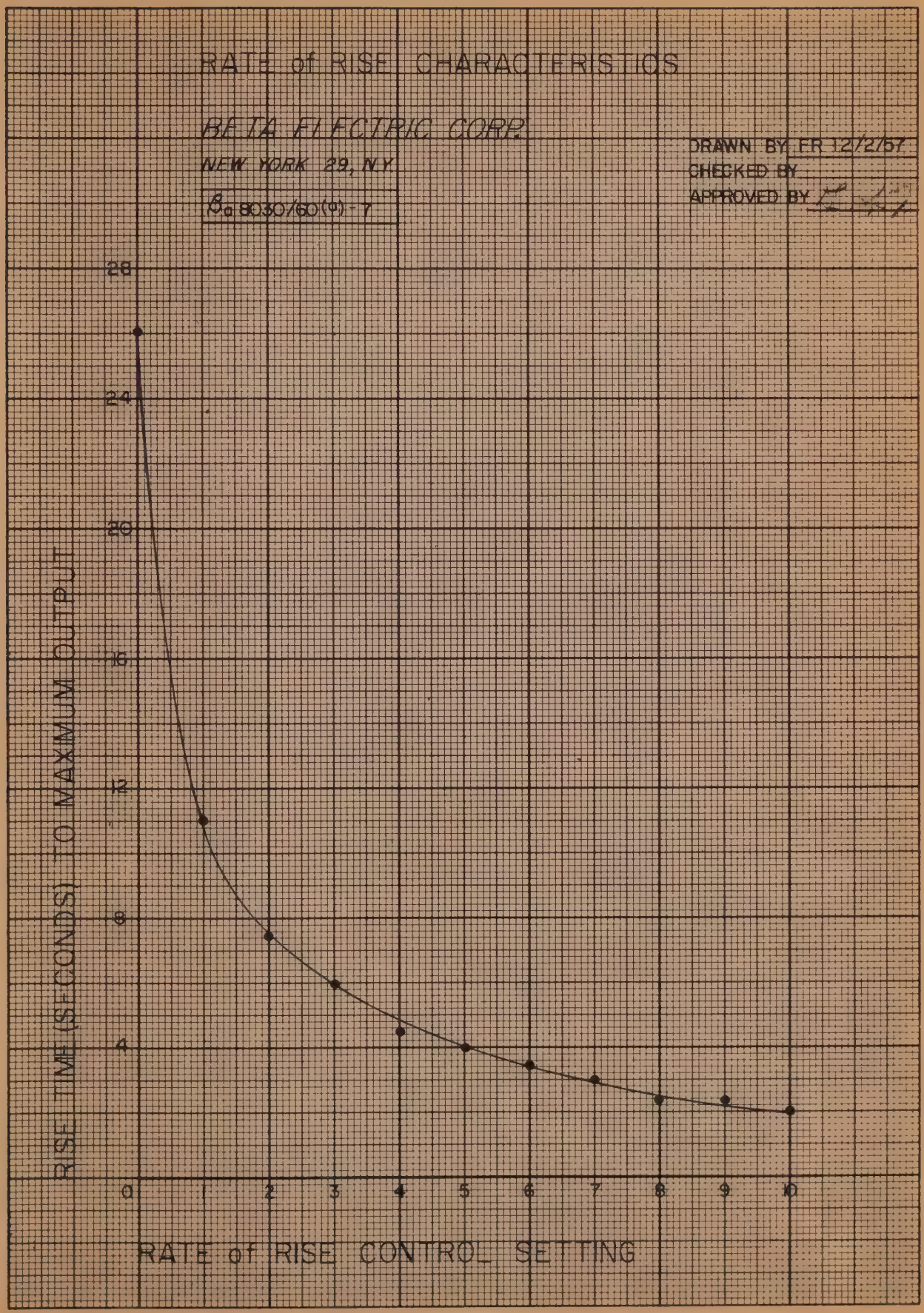
NO. 340A .20 DIETZGEN GRAPH PAPER
20 X 30 PER INCH



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MADE IN U. S. A.
NO. 340A .20 DIETZGEN GRAPH PAPER
20 X 20 PER INCH

NO	REVISION	BY	DATE
1	K90, 91; S85 added	DS	5/58

MODEL 8030/60 (a) Power Supply-CONTROLS

DATE 9/27/57

TYPED BY: jc

CHECKED BY

APP'D BY

BETA ELECTRIC CORP.
DIV. OF SORENSEN & CO., INC.

PARTS LIST. PAGE 1

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
A1	2A Premier #POR-3518 gray hammertone, 21-3/4"wide x 18" deep x 36-3/4" high.		Houses controls.
A2	20A #12 gauge, 35" high x 19" wide, W.E. notching.	A1	Mounts controls and meters.
A3	22A Plate, 35" x 19" no notchings, #12 gauge	A1	Mounts control components.
B81	1B	Subpanel	Motor for T81.
C1,2	42C .01 mfd, 600V DC.	Panel	RF noise suppressors.
C3	10C 0.25 mfd, 400V DC.	Subpanel	Surge filter.
C4	12C 2 mfd, 200V	Subpanel	Stores energy to trip K4.
C5	16C 6 mfd, 150V DC.	Subpanel	Surge filter.
C6	12C 2 mfd, 200V	Subpanel	K2 filter.
C81	22C	Subpanel	Surge suppressor.
C82	14C	Subpanel	M2 filter on AC.
E1a,b,c	350E 1/2	Panel	Buss bar standoffs.
E2a,b	350E 1	Panel	Tiepoints.
E3a-c	Knob, Raytheon 70-3-2	Panel	Control knobs.
E4a-d	Knob, Raytheon 90-3-2	Panel	Control knobs.
E5	407E Black	Panel	Pushbutton cap.
E6	409E	Subpanel	Surge protector
H1	44H AN 3057-20	P5	Cable clamp.
H2	NOT USED		
H3a	NOT USED		
H3b	58H P-a58H-200C-ZSB-F	Panel	Zero start bracket.
H4a,b	P-a-2000-H	Panel	Handles.
H5a,b	45H "C" clamp, 5/8"D	Panel	Capacitor clamps.
H6a,b	42H AN 742D20C	Cab.&Panel	Cable clamps.
H81	NOT USED		

NO	REVISION	BY	DATE

MODEL 8030/60 (a) Power Supply - CONTROLS

DATE 9/27/57

TYPED BY: jc

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BETA ELECTRIC CORP.
DIV. OF SORENSEN & CO., INC.

PARTS LIST. PAGE 2

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
I1	1I Neon glow lamp #NE-51	Panel	Ind. main power breaker off.
I2	1I PER I1	Panel	Ind. control power breaker off.
I3	1I PER I1	Panel	Ind.high voltage xfrmr breaker off.
I4	1I PER I1	Panel	Ind. fine HV control input breaker off.
I5	1I PER I1	Panel	Ind. fine HV control output breaker off.
I6	1I PER I1	Panel	Ind. door interlock open.
I7	1I PER I1	Panel	Ind. external interlock open.
I8	NOT USED		
I9	1I PER I1	Panel	Ind. set fine HV control to zero.
I10	2I Incandescent #6S6-145V-6W	Panel	Indicates overvoltage.
I11	2I PER I10	Panel	Indicates overload.
I12	2I PER I10	Panel	Indicates high voltage ready.
I13	2I PER I10	Panel	Indicates high voltage on.
I14	3I 115V/200 W	Subpanel	Non-linear slowdown resistance.
I15	NOT USED		
I81-83	1I PER I1	Panel	Indicate as labelled.
J1	52J	Subpanel	AC input power.
J2	101J Amphenol 61-F1	Subpanel	Aux. 115 volt ac outlet.
J3	3J 97 3102A-18-4S	Subpanel	External interlock.
J4	105J ICA #631	Subpanel	Ground post.
J5	AN 3102A-32-9S	Subpanel	Control-HVS interconnector.
J81	54J	Subpanel	AC low end return.
K1	28K Allen-Bradley contractor, size 2, #702BOD92, NO, NC	Subpanel	Power contactor.
K1a	Aux. contact, normally closed, #8501.	K1	Normally closed aux. contact.
K2	12K	Subpanel	Overload relay.
K3	35K	Subpanel	Overload holding relay.
K4	12K Kurman BK35	Subpanel	Overvoltage relay.
K5	35K	Subpanel	Overvoltage holding relay.
K6	NOT USED		
K7	NOT USED		
K81-89	5K	Subpanel	Motor circuitry relays.
K90	24K	On S13	Relay for AC operation.
K91	35K	On S13	Relay for AC operation.

NO	REVISION	BY	DATE

MODEL 8030/60 (a) Power Supply-CONTROLS

DATE 9/27/57

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BETA ELECTRIC CORP.
DIV. OF SORENSEN & Co., INC.

PARTS LIST. PAGE 3

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
M1	Simpson #1329, 0-50 μa dc.	Panel	Kilovoltmeter.
M1d	labelled 0-6/30/60 KILOVOLTS DC and 0-3/15/30 PEAK KILOVOLTS.	On M1	Dial.
M2	Simpson #1329,0-50 μa dc.	Panel	Milliammeter.
M2d	labelled 0-2/10/20 MILLIAMPERES RMS and 0-0.5/2/5 MILLIAMPERES DC.	On M2	Dial.
NP1	Beta spec. plate, β-a-2000-SP.	Controls	Specifies Vout, Iout, Model, Serial # and input.
O1-4	NOT USED		
O5	60 H2472	On T81	Reduction gear.
O6	60 H2420	On B81	Reduction gear.
O81	Miller A012 right angle drive	Panel	Gangs OL Pots R22 & R91
O82a,b	100		flex shaft (3")
O83a,b,c,d	80		1/4 coupling
P1	52P	Subpanel	Mates with J1.
P2	NOT USED		
P3	3P 97-3106A-18-4P	Subpanel	Mates with J3.
P4	NOT USED		
P5	AN 3106A-32-9P	Subpanel	Mates with J5.
P81	54P	Subpanel	Mates with J81.
R1-3	1R 100k/10/1	Panel	Neon pilot light return current path.
R4-6	NOT USED		
R7	1R 100k/10/1	Panel	Neon pilot light return current path.
R8	1R 4M/10/1	Panel	Neon pilot light sneak path illumination suppressor.
R9	NOT USED		

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MODEL 8030/60 (a) Power Supply-CONTROLS

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PARTS LIST. PAGE 4

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
R10	1R 100k/10/1	Panel	Neon pilot light return current path.
R11	2R 650k	Subpanel	Fires V5 at excessive current.
R12	2R 650k	Subpanel	Fires V3 at excessive current.
R13	12R 2.0M, IRC #Q17-139	Panel	Overvoltage fine calibrator.
R14	10R 500k (fixed) 3W	Subpanel	Overvoltage fine calibrator.
R15	10R 1 meg (fixed) 3W	Subpanel	Low calibrator for M1.
R16	10R 500k (fixed) 3W	Subpanel	Medium calibrator for M1.
R17	10R 50k (fixed) 3W	Subpanel	High calibrator for M1.
R18	10R 100k (fixed) 3W	Subpanel	Low calibrator for M2.
R19	10R 50k	Subpanel	Medium calibrator for M2.
R20	10R 10k	Subpanel	High calibrator for M2.
R21	6R 5k/5	Subpanel	Solenoid anti-sticking resistor.
R22	3R 50k	Panel	Fine overload calibrator on DC.
R23	2R 6.5K	Subpanel	Coarse overload calibrator on DC.
R24	6R 0.11 ohms, 220W	Subpanel	Slowdown resistor.
R25	NOT USED		
R81	10R 50k	Subpanel	M2 calibrator on 2 ma ac range.
R82a	10R 1k/W 4	Subpanel	M2 fine calibrator on 10 ma ac range.
R82b	2R 2K	Subpanel	M2 coarse calibrator on 10 ma ac range.
R83a	10R 1k/W 4	Subpanel	M2 calibrator on 20 ma ac range.
R84	10R 1M	Subpanel	3 kv ac calibration.
R85	10R 500k	Subpanel	15 kv ac calibration.
R86	10R 50k	Subpanel	30 kv ac calibration.
R87	6R 7k, 10 W	Subpanel	Flashes E6 at excessive M2 current. on ac.
R88	2R 14k	Subpanel	Fires V3 at excessive M2 ac current
R89	2R 20k	Subpanel	M2 calibrator on AC.
R90	2R 1k	Subpanel	Bleeder
R91	3R 100k	Panel	Fine overload calibrator on AC.
R92	6R 7k, 5W	Subpanel	Coarse overload calibrator on AC.
R93	6R 200 ohms, 20W	Subpanel	Dropping resistor for B81.
R83b	2R 500 ohms	Subpanel	M2 calibrator on 20 ma ac range.
S1a,b	102S (with handle extension #CB-119) 15 amperes.	Panel	Main power breakers.
S2	102S 3 amperes.	Panel	Control power breaker.
S3	Heinemann #0411RS, curve 2, 10 amperes	Panel	High voltage transformer input breaker.
S4	102S 1.5 amperes	Panel	Fine control power breaker.

NO	REVISION	BY	DATE

MODEL 8030/60 (a) Power Supply-CONTROLS

DATE 9/27/57

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PARTS LIST, PAGE 5

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
S5	102S (with handle extension #CB-119) 1.5 amperes.	Panel	Fine control power breaker.
S6	Allen-Bradley 800T, type B6A, red.	Panel	High voltage off pushbutton.
S7	5S AH&H 3392A	Panel	Zero start bypass pushbutton.
S8	Per S6, type A2B, black	Panel	High voltage on pushbutton.
S9	1S SPDT, 10A, Microswitch 2AC2.	Con.Cab.	Door interlock.
S10	NOT USED		
S11	7S Centralab #2504	Panel	M1 meter range selector.
S12	7S Centralab #2504	Panel	M2 meter range selector.
S13	Centralab #JV-9010	Panel	Meter polarity selector.
S14	NOT USED		
S15	NOT USED		
S16	17S Microswitch BZ-2RW8G-A2	Panel	T2 zero start switch.
S81	PER S8	Panel	Raise pushbutton.
S82	PER S8	Panel	Lower pushbutton.
S83	17S PER S16	On T81	Upper limit switch.
S84	17S PER S16	On T81	Lower limit switch.
S85	17S	On S13	Operates K90 and 91 on AC.
T1	501T V-10	Panel	Maximum output voltage control.
T2	500T 10/115/1.25	Panel	Fine high voltage control.
T3	200T UTC #S53	Subpanel	Fine injection transformers.
T4	NOT USED		
T81	501T PER T1	Subpanel	Output voltage control.
T82	117V,60 cps, 25.2V,1A,1500 volts insulation. Stancor #P-6469.	Subpanel	Minimum rate of rise voltage adjust.
T83	PER T2	Panel	Rate of rise control.
T84	UTC R-46 (1200VA)		Step down transformer
V1,2	NOT USED		
V3	VR75	Subpanel	Surge protector for M1.
V4	VR75	Subpanel	Trips overvoltage relay K4 upon firing.
V5	VR75	Subpanel	Surge protectors for M2.
V81	VR75	Subpanel	Surge protector on AC.
V6a,b	16V VR150		
W1	8W 15 ft., 14 conductor, 12 #16 wires, 2 #4 wires, rubber insulation, neoprene outer jacket.		Control-HVS interconnecting cable.

NO	REVISION	BY	DATE

MODEL 8030/60(a) Power Supply-CONTROLS

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PARTS LIST. PAGE 6

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
W2	NOT USED		
CR81a-d	8CR	Subpanel	B1 armature rectifiers.
CR82a-d	8CR	Subpanel	B1 field rectifiers.
CR83a-d	8CR	Subpanel	Overload relay rectifiers for AC.
CR84	3CR	Subpanel	M2 rectifiers for AC.
XI1-7	1XI Dialco 811308-117	Panel	Hold respective pilot lights.
XI8	NOT USED		
XI9	1XI PER XI1	Panel	Holds respective pilot light.
XI10	4XI blue, Dialco 51911-114	Panel	Holds respective pilot light.
XI11	4XI yellow, Dialco 51901-116	Panel	Holds respective pilot light.
XI12	4XI green, Dialco 51901-112	Panel	Holds respective pilot light.
XI13	4XI red, Dialco 51901-111	Panel	Holds respective pilot light.
XI14	8XV	Subpanel	Holds respective pilot lamp.
XI15	1XI PER XI1	Panel	Holds respective pilot light.
XI81	1XI PER XI1	Panel	Holds respective pilot light.
XV1-4	2XV Octal Amphenol #77-MIP-8	Subpanel	VR tube sockets.
XV5	NOT USED		
XV81-3	2XV	Subpanel	VR tube socket.
TB1	Curtis RH-3	Subpanel	Meter connection test points for H.V. xfrmr input voltage & current.
TB81	1TB4	Subpanel	T82 tiepoints.
TB82,3	2TB	Subpanel	Mount components.
TB84	1TB4	Subpanel	B81 tie points

NO.	REVISION	BY	DATE
1	P9b,97; T35; P35, 8c;	DS	5/58
	CR1,2 added.	DS	5/58

MODEL 8030/60 (a) H.V. SECTION

DATE 9/27/57

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PARTS LIST. PAGE 1

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
A8	31A Per Dwg. ßc 31A-2100-120		Mounts high voltage components.
A9	30A Per Dwg. ßc 30A-2100-120 a&b		Houses high voltage components.
C83	9C .02 mfd, 30 KV DC W		Charging capacitor.
C84a,b	PER C83		Doubler and filter capacitors.
E6,7,8,9,	NOT USED		
E10-15	409E		Line flashover protectors.
E81	376E Corona free bushing, Lapp #49125		AC output bushing
E82	25		Anti Corona Shield.
H7	40H19		Output cable clamp
H8	NOT USED		
H9	82H		Port lights.
J6	AN 3102A-32-9P		HVS-Control interconnector.
J7	50J Banana Birnbach #394		High voltage output jack on DC.
J8a-d	51J Banana Birnbach #403		Polarity reversal on DC.
K8	26K		Shorting Solenoid
M2	Beta spec. plate ß-a-2000-SP.		Specifies Vout, Iout, Model #, Serial #, input.
01-4	30		Casters

NO.	REVISION	BY	DATE

MODEL 8030/60 (a) H.V. SECTION

DATE 9/27/57

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PARTS LIST. PAGE 2

PART NO.	BETA CODE NO. AND DESCRIPTION	LOCATION	FUNCTION
P6	AN 3106A-32-9S.		Mates J6.
P7	50Pb Banana Birnbach #397		Mates J7.
P8a-d	51P Banana Birnbach #401		Mates J8a-d.
P9a,b	103P Tube Caps		On V1,2
R26	4R .1M DPX 15		Short circuit current limiter on DC
R27	4R 1MBFW 15		Shorting mechanism surge suppressor
R28a,b	4R 30 BFW 15		Kilovoltmeter multipliers, on DC
R29a,b	4R 50 K FFW 15		Peak current limiters
R94a,b	4R 1000 BFW 15		Voltage equalizers & bleeders.
R95	NOT USED		
R96a,b	4R 10 BFT 15.		Kilovoltmeter multipliers on DC.
R97a,b	4R 10 BFT 15.		Overvoltage multipliers on DC.
T5	315T		High voltage transformer.
T6a,b	114T		
T85	303T		Filament transformers.
V1,2	9V		HV rectifiers
W3	4W RG 19/U 12 feet.		Output cable on DC.
XV6,7	8XV		Hold respective rectifiers
TB3,4	1TB 6		Filament transformer tie point
TB5	NOT USED		
TB6	2TB 5		H.V. transformer primary tie point.
TB85	9TB		CR1 tie board.
TB86	9TB		CR2 tie board.
CR1a-d	Federal Radio #1159		Rectifiers.
CR2a-d	Per CR1a-d.		Rectifiers.

BETA ELECTRIC CORP.

NEW YORK 29, N. Y.

This booklet contains standard symbols, letter nomenclature and detailed specifications of parts used in Beta Electric Corp. high voltage power supplies and other equipment.

In the parts list accompanying this instruction manual there are Beta code numbers for various circuit and structural components. The detailed specifications are contained in this booklet, and can be found under the proper code number heading.

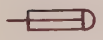
The parts are listed numerically and alphabetically according to letter nomenclature.

In the parts list, detailed specifications are included only for those components that are not listed in the booklet.

October 1955

C CAPACITOR

E SPARK GAP

E  STANDARD INSULATOR

F FUSE

I NEON GLOW LAMP

I INCANDESCENT LAMP

J 2-POLE MALE RECEPTACLE

J 2-POLE FEMALE RECEPTACLE

J 3-POLE MALE RECEPTACLE

J BANANA JACK; BINDING POST

J "AN" RECEPTACLE

J PHONE JACK

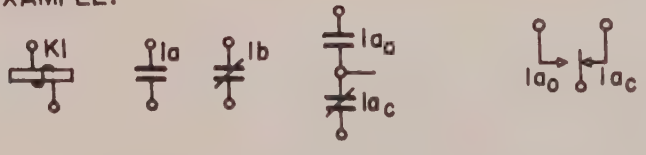
K RELAY

NORMALLY OPEN CONTACTS

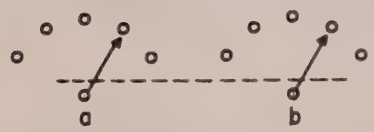
NORMALLY CLOSED CONTACTS

SINGLE POLE DOUBLE THROW CONTACTS

EXAMPLE:



K SOLENOID RELAY

L		FILTER CHOKE
M		METER
P		BANANA PLUG
R		RESISTOR
R		POTENTIOMETER, RHEOSTAT
S		PUSHBUTTON SWITCH, NORMALLY CLOSED
S		PUSHBUTTON SWITCH, NORMALLY OPEN
S		TOGGLE SWITCH, MICRO-SWITCH, ETC., ROTARY SNAP SWITCH, ETC.,
S		ROTARY SELECTOR SWITCH, GANGED
T		TRANSFORMER
		COVAT
T		AUTO TRANSFORMER
W		INDICATES SHIELDED WIRE
W		WIRING TERMINAL
W		PHYSICAL CONNECTION (SOLDER, ETC.)

NOTE:
MANY SELF-EXPLANATORY SYMBOLS SUCH AS RECTIFIERS, AMPLIFIER TUBES, ETC., ARE NOT INCLUDED HEREIN.

THE FOLLOWING IS AN EXCERPT FROM 16B16(RE) 1 July 1946, the BUREAU OF SHIPS INTERIM SPECIFICATION FOR INSTRUCTION BOOKS FOR ELECTRONIC EQUIPMENT, par. E1i:

STANDARD COMPONENT DESIGNATIONS

SYMBOL	DEFINITION
A	Structural parts, panels, frames, castings, etc.
B	Motors and prime movers, self-synchronous motors, etc.
C	Capacitors of all types.
D	Dynamotors, rotary converters.
E	Miscellaneous electrical parts; insulators, knobs, brushes, antennas, etc.
F	Fuses
G	Generators, exciters, etc.
H	Hardware, screws, bolts, studs, pins, etc.
I	Indicating devices, (except meters and thermometers), pilot lamps, etc.
J	Jacks and receptacles (fixed connectors, male or female.)
K	Contactors, relays.
L	Inductors, r.f. and a.f.
M	Meters of all types, gauges, thermometers, etc.
O	Mechanical parts; bearings, shafts, couplings, gears, etc.
P	Plugs (movable connectors, male or female).
Q	Diaphragms (microphone, telephone, projector, etc.).
R	Resistors, fixed and variable, potentiometers, attenuators, etc.
S	Switches, interlocks, thermostats, thermo-regulators.
T	Transformers, r.f., a.f. and power.
U	Hydraulic parts.
V	Vacuum and gaseous discharge tubes.
W	Wires, interconnecting cables, etc., wave guides, transmission lines, delay lines, shield wires.
X	Sockets (electron tubes, pilot lamps, fuses, etc.)*
Y	Mechanical oscillators, crystals, magnetostriction tubes, etc.
Z	Filters, i-f transformers, compound tuned circuit assemblies, etc., in a common container.
BT	Batteries
CR	Rectifiers (electrochemical, copper oxide, selenium, crystal, etc., except vacuum or gaseous tubes).
HS	Handset (telephone and microphone combination).
HR	Heater.
HT	Head telephones.
HX	Heat exchangers.
LS	Loudspeakers.
MG	Motor generators (single unit).
MI	Microphones (hand or chest set type).
TB	Terminal boards.
TY	Surge eliminators (special discharge resistors).
VR	Voltage regulators (except vacuum or gaseous tubes).

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* The symbol designation for sockets shall bear the same basic number as for the associated component. To accomplish this, the appropriate symbol letter shall be prefixed with the letter "X", e.g. use "XV" for tube sockets, "XI" for pilot lamps, sockets, etc.

STANDARD PARTS LIST FOR INSTRUCTION MANUALS

(NOTE: Wherever "ac" is specified, this implies 50/60 cycle rating.)

Item number and letter designation	Type of Component	Description
1A	Cabinet, relay rack	Relay rack cabinet for standard 19" panels with "W.E." notching. 22" wide x 18" deep; black wrinkle finish; all welded construction, rounded corners. Per Premier Metal Products Co. Series R units; or Par-Metal Products Corp. Series ER. Number after 1A designates nominal panel space. EXAMPLE: 1A-36 3/4 = Premier Model R3619, cabinet as above, with 36-3/4" panel space. With letter G as suffix, paint is grey wrinkle; use zinc-chromate primer. With letter GH as suffix, paint is grey hammertone, use zinc-chromate primer. EXAMPLE: 1A-36 3/4G.
2A	Cabinet, desk panel	Desk panel cabinet for standard 19" panels with "W.E." notching. 22" wide x 18" deep; black wrinkle finish; all welded construction, rounded corners, Per Premier Metal Products Co. Series DCR units, or Par Metal Prod. Corp. Series DL. Number after 2A designates nominal panel space. EXAMPLE: 2A-8 3/4 = Premier Model DCR8, cabinet as above, with 8-3/4" panel space. With letter G as suffix, paint is grey wrinkle, use zinc-chromate primer. With letter GH as suffix, paint is grey hammertone, use zinc-chromate primer. EXAMPLE: 2A-8 3/4G
3A	Cabinet or Housing, metal	Any metal housing, other than an oil-filled tank, or standard cabinet per 1A or 2A. Number after 3A designates βeta drawing number. EXAMPLE: 3A-β-c-201A2 = cabinet for series 201 power supplies. With letter G as suffix, paint is grey wrinkle, use zinc-chromate primer. With letter GH as suffix, paint is greyhammertone, use zinc-chromate primer. EXAMPLE: 3A-β-c-201A2G

Item number and letter designation	Type of Component	Description
10A	Chassis	Standard chassis, #16 gauge, steel or aluminum. Numbers after 10A designate height, length and width; construction per Premier Metal Products Series CH, or Par Metal type C. EXAMPLE: 10A-S-3X17X10 = Chassis, steel, 16 gauge, black wrinkle finish, 3" high 17" long 10" wide, Premier #CH415. Standard color is black wrinkle. With letter G as suffix, paint is grey wrinkle, use zinc-chromate primer. With letter GH as suffix, paint is grey hammertone, use zinc-chromate primer. Letter Z as suffix, represents zinc plated.
11A	Chassis	Any chassis other than standard chassis per 10A. Number after 11A designates βeta drawing number. EXAMPLE: 11A-β-c-A103 = Chassis with integral mounting brackets, 17 x 10 x 2", as per drawing β-c-A103. Standard color, see 10A.
20A	Panel	Aluminum panel, with standard ".W.E" notching, 19" wide x 1/8" thick, Par Metal Series 6675 - 6686, or Premier Metal Series ARP. Number after 20A designates nominal height and finish. EXAMPLE: 20A-21B = Aluminum panel, 19" wide x 1/8" thick x 21" high, black wrinkle finish, Premier ARP 2119,B. 20A-21G = Aluminum panel, 19" wide x 1/8" thick x 21" high, grey wrinkle finish, Par Metal G-6686. 20A-19GH= Aluminum panel, 19" wide x 1/8" thick x 19" high, grey hammertone, Premier ARP-1919, with special finish.
21A	Panel	Steel panels, per 20A specifications.
22A	Panel	Any metal panel other than panels included in 20A and 21A. Number after 22A designates βeta drawing number. EXAMPLE: 22A-β-c-701-CP2 = special panel for βeta Model 701 Portable Projection Oscilloscope, drawing β-c-701-CP2.
23A	Panel	Bakelite panel, fabricated to βeta specifications. Number after 23A designates βeta drawing number. EXAMPLE: 23A-β-a-101A1 = Bakelite panel for Model 101 and 102 kilovoltmeters, per drawing β-a-101-A1.

Item number and letter designation	Type of Component	Description
30A	Tank and cover	Complete tank and cover assembly. Number after 30A designates βeta drawing number. EXAMPLE: 30A-β-c-2010-A1,A2 = tank, frame and cover assembly, for Model 2010 power supply, per drawings β-c-2010-A1,A2.
31A	Frame	Frame assembly; number after 31A designates βeta drawing number.
32A	Integral cabinet & tank ass.	Complete tank, cover, frame and cabinet assembly. Number after 32A designates βeta drawing number. EXAMPLE: 32A-β-d-32A-3080-120 = Integral cabinet and tank assembly for 80-120 kv series 3000 overpotential testers. With letter G as suffix, paint is grey wrinkle; use zinc-chromate primer. With letter GH as suffix, paint is grey hammertone; use zinc-chromate primer.
50A	Potting can	Potting can, fabricated to βeta specifications. Number after 50A designates βeta drawing number. EXAMPLE: 50A-β-a-A102-224-1 = Potting can for Model 224 power supply, per dwg. β-a-A102-224-1.
51A	Housing	Output shorting mechanism housing, fabricated to βeta specifications. Number after 51A designates βeta drawing number. EXAMPLE: 51A-β-a-105 = Output shorting mechanism housing per dwg. β-a-A-105.
52A	Lucite	Fabricated lucite, to βeta specifications. Number after 52A designates βeta drawing number, EXAMPLE: 52A-β-a-A-104 = Lucite box as per drawing β-a-A-104.
53A	Bakelite	Fabricated bakelite, specifications per 52A.
54A	Glastic	Fabricated glastic, specifications per 52A.
55A	Formica	Fabricated formica, specifications per 52A.
56A	Roller assembly	Roller truck assembly for standard 22" width cabinet. Premier Metal Products Co. or Par Metal RT series. Number after 56A designates nominal depth of cabinet it supports. EXAMPLE: 56A-18 1/2 = Roller truck assembly, 22" wide 18-1/2" deep. Premier RT 1101.

Item number and letter designation	Type of Component	Description
57A	Chassis brackets	Chassis brackets, 16 gauge, black finish. Premier Metal CB or Par Metal SB series. Number after 57A designates length of base, EXAMPLE: 57A-8 = Chassis brackets, 8" long. Premier CB-78 or equivalent.
58A	Chassis brackets	Special chassis brackets, fabricated to βeta specifications. Number after 58A designates βeta dwg. number.
59A	Distribution box	Distribution box, fabricated to βeta specifications.
70A	Adapter	20" cabinet adapter. Number after 70A designates βeta drawing number.
71A	Adapter	Tank cabinet channel adapter. Number after 71A designates βeta drawing number.
72A	Adapter	Tank cabinet channel adapter, per dwg. β-c-72A-2040-60.
73A	Adapter	Tank cabinet channel adapter, per dwg. β-c-73A-2080-120.
74A	Adapter	Tank cabinet channel adapter, per dwg. β-c-74A-2120-150.
1B	Motor	1/150 HP; 2000 RPM; 200/1 speed reducer, output shaft speed 10 RPM, 75 V DC, shunt wound motor; Bodine #NSH-11R.
2B	Motor	1/40 HP; 1725 RPM; 115 V ac, split phase, reversible.
3B	Motor	DC motor 1/20 HP, 1725 RPM, 115 V dc, shunt, G.E. #738. Servo-Tek #S-348.
13B	Motor	Blower, 115V, 60 cycles AC. Motor, 8" blade, Redmond #59L.
14B	Motor	Doubler blower, 110V, 60 cycles ac with flange; Redmond MTR-3197.
14B-s	Screen	Screen for above; Redmond MTR-105.
15B	Motor	Blower, 110V, 60 cycles ac with flange; Redmond MTR BL-80.
15B-s	Screen	Screen for above; Redmond MTR-104.
16B	Motor	Blower, 110V, 60 cycles ac with flange; Redmond MTR 38830.
17B	Motor	Double blower, 115 V ac, with flange; Redmond MTR 3140, 220CFM, 1550 RPM.
18B	Motor	Blower, 115 V ac, Redmond MTR 3198, 50 CFM, 1550 RPM.

Item number and letter designation		Type of Component	Description
1C		Capacitor	0.001 mfd, 60 kv dc; glass tubular; βeta #201021.
2C		Capacitor	0.002 mfd, 20 kv dc; glass tubular.
3C		Capacitor	0.005 mfd, 10 kv dc; glass tubular.
4C		Capacitor	0.006 mfd, 75 kv dc; βeta #21728.
5C		Capacitor	0.007-0.007 mfd, 11 kv dc; 1 terminal 11 kv; 1 terminal 22 kv; βeta #00221.
6C		Capacitor	0.008 mfd, 60 kv dc; βeta #21727.
7C		Capacitor	0.01 mfd, 400 V dc; paper; Micamold #339 BR 110 or equivalent.
8C		Capacitor	0.01-0.01 mfd, 16 kv dc; 1 terminal 16 kv; 1 terminal 32 kv; βeta #20123.
9C		Capacitor	0.02 mfd, 30 kv dc; βeta #21723.
9C1		Capacitor	0.02 mfd, 30 kv dc; tubular with epoxy seal; Plastic Capacitor #0P-300-203.
10C		Capacitor	0.25 mfd, 400 V dc; paper; Cornell-Dubilier #PH4P25, or equivalent.
11C		Capacitor	1 mfd, 400 V dc; paper; "bathtub", side terminals. Aerovox type 30, or equivalent.
12C		Capacitor	2 mfd, 200 V dc; metallized paper; Aerovox P82 or equivalent.
13C		Capacitor	8-8 mfd, 600 V dc; paper, Tobe-Deutschmann Corp., "Filtermite" type PT-SC-11; 4 pin plug-in base.
14C		Capacitor	20 mfd, 150 V dc, dry electrolytic; Aerovox PRS, or equivalent.
15C	DEAD	Capacitor	100 mfd, 50 V dc, dry electrolytic; Sangamo MTH-5010 or equivalent.
16C		Capacitor	6 mfd, 150 V dc; metallized paper; Astron type MRF, 1.5-6M or equivalent.
17C		Capacitor	100 mfd, 150 V dc; electrolytic; Aerovox PRS or equiv.
18C		Capacitor	500 mfd, 25 V dc; electrolytic; Aerovox PRS or equiv.
19C		Capacitor	.5 x .5 mfd, 16 kv, βeta #3022 (with mounting brackets.)
20C		Capacitor	0.01 mfd, 45 kv dc; 45 kv dc working, 60 kv dc test. Bakelite tube, epoxy seal, with stud for mounting.

Item number and letter designation	Type of Component	Description
21C	Capacitor	0.1 mfd, 15 kv dc; βeta #1521 (with mounting brackets.)
21C1	Capacitor	0.1 mfd, 15 kv dc; βeta #1521 A-tubular with epoxy seal.
22C	Capacitor	.05 mfd, 500 V dc; Sangamo type 35.
23C	Capacitor	.1 mfd, 400V dc tubular; paper dielectric; Sangamo #350401.
24C	Capacitor	2 mfd, 5 kv, 1 terminal with mounting brackets. PC #0E 50-205B (ground stud should be provided on tap.)
25C	Capacitor	0.25 mfd, 30 kv dc, low end connected to case; with mounting brackets; βeta #3023.
1E	Shield	Anti-corona tube socket shield, open end type; βeta #ACS-1.
2E	Shield	Anti-corona tube socket shield, fully enclosed type; βeta #E-1.
3E	Tube shield	Miniature Amphenol #5-508 or equivalent.
4E	Shield	Rubber shield for battery clip. For Mueller #27 clip. Red or black. Indicate R or B after 4E.
5E	Shield	Rubber shield for battery clip. For Mueller #29 clip. Red or black. Indicate R or B after 5E.
6E	Shield	Tube shield, Cinch Jones 7S series. Number after 6E designates size.
7E	Shield	Tube shield, Cinch Jones 9S series. Number after 7E designates size.
300E	Bushing	All Heyman Manufacturing Co., nylon strain relief bushings, Series SR-P. Number after 300E designates ICA number.
301E	Bushing	All Insuline Corp. of America bakelite feed-through bushings, Series 600. Number after 301E designates ICA number.
302E	Bushing	Feedthrough bushing 9 kv, 45A rating. Heldor #875A, style 5.
303E	Bushing	Feedthrough bushing, 55 kv, 50A rating. Heldor #2625-1, style 10.

Item number and letter designation	Type of Component	Description
304E	Bushing	Lucite feedthrough bushing with nut. 1/2" O.D., 1/8" hole diameter. Bud #457.
305E	Bushing	Porcelain feedthrough bushing. 7/8" panel hole, for 3/8" panel thickness. 7/16" hole size. Universal Clay Products #PB-3.
306E	Standoff	Steatite standoff insulator; 1/2" diameter, #8 thread on both sides. Birnbach Radio Co. Series 443. Number after 306E denotes standoff height. EXAMPLE: 306E-1/2 = 1/2" standoff, Birnbach #443.
307E	Standoff	Steatite standoff bushing, 4-1/2" high x 2-1/4" x 2-1/4" base, with Birnbach jack #395 on top; Birnbach assembly #4451J.
308E	Bushing	Bushing, OZ type BBL or equivalent. Number after 308E designates hole size.
309E	Bushing	Feedthrough, insulating bushing. Adelet Series Peml. Number after 309E designates I.D.
407E	Pushbutton	Pushbutton for Arrow-Hart & Hegeman pushbutton switch 3392A, Beta code #5S. AH&H #3391-194.
408E	Substation protector	Automatic Electric type 16, Cat. #SA57.
409E	Spark plugs	10mm thread, Autolite PR-4 sparkplugs.
410E	Spark gap contacts	Naval bronze spark gap contacts. (Naval balls) Number after 410E designates diameter.
411E	Soldering ferrule	Soldering ferrule, Amphenol #AN 9769-16.
412E	Conduit	Flexible conduit. Type EF. Number after 412E designates diameter of conduit.
413E	Connector	Connector for conduit. Appleton Series. Number after 413E designates size of connector.
414E	Ferrule	Ferrule only for Appleton connectors. Order according to connector catalog number. EXAMPLE: 414E 3/8 = Ferrule only for 3/8 Appleton connector #CFST 3/8.
440E	Knob	1" round black melamine knob; shaft diameter 1/4". Kurz-Kasch #S-308-64-BB-DD. (Formerly 402E).
441E	Knob	ICA #12743, pointed. (Formerly 403E.)
442E	Knob	Used with G.B. 371-A potentiometer. General Radio KNSP-8.

Item number and letter designation	Type of Component	Description
	NOTE:	In fuse specifications, number after letters represents current rating. (i.e., 2F 10 = specs per 2F,10A rating).
1F	Fuse	Extractor post cartridge fuse, quick acting type. 250 V ac rating; Littelfuse type 3AG or equivalent. Fuse ratings 1/16 to 6 amperes.
2F	Fuse	Extractor post cartridge fuse, quick acting type. 250V ac rating; Littelfuse type 3AB or equivalent. Fuse ratings 8 to 20 amperes.
3F	Fuse	Extractor post cartridge fuse, quick acting type. 250 V ac rating; Bussman type BAF or equivalent. Fuse ratings 10 to 30 amperes.
4F	Fuse	Extractor post cartridge fuse, "Slo-blo" type. 125 V ac rating; Littelfuse type 3AG "slo-blo" series 313 or equivalent (Fuse ratings 1/100 to rating:
5F	Fuse	Plug type fuse, standard Edison screw base; transparent top. General Electric type PY, or equiv. 125 V ac rating. (Fuse ratings 3 to 30 amperes.)
6F	Fuse	Enclosed, 1 time cartridge fuse; 250V ac, 20 to 60 amperes rating; General Electric type GF4A or equiv.
7F	Fuse	Fusetron fuse, "Slo-blo" #FRS-15, 600 volt. (Fuse ratings 1/10 - 600 amperes.
40H	Cable clamp	For high voltage cable, per dwg. β-HVCC-3. Number following H represents RG cable number that clamp fits. EXAMPLE: 40H 8 = clamp per above specifications for RG 8/U cable.
41H	Cable clamp	Plastic, Ethyloc plastic cable clips, type 6R, series CPC-742. Number following H is nominal diameter of cable that is clamped. EXAMPLE: 41H 1/8 = Clamp per above specifications, for 1/8" diameter cable. Ethyloc plastic type 6R.
42H	Cable clamp	Cable; aluminum, neoprene coated; specify by nominal diameter; ADEL Series 742 or equivalent.
43H	Tube clamp	Birtcher Series 926. Number following H represents nominal tube base diameter. EXAMPLE: 43H 1-1/8 = Birtcher #926B, for 1-1/8" tube base.
44H	Cable clamp	For AN type connector. Number after H designates AN 3057 designation. EXAMPLE: 44H 6 = AN 3057-6 cable clamp.

Item number and letter designation	Type of Component	Description
45H	Mounting clamp	Steel, cadmium plated circular clamp, usually associated with electrolytic capacitor mounting applications. Cornell Dubilier Series 1300-1800, and Mallory Series VR, or equivalent. Number after H designates nominal diameter of clamps. EXAMPLE: 45H 5/8 = clamp for 5/8" diameter. Cornell Dubilier #17920, or equivalent.
46H	Mounting clamp for kilovoltmeter multiplier	Steel clamp, black for multi-cylinder. #20 gauge, I.D. 6-1/4" in height 5-in, mounts multiplier for I11 kilovoltmeter, drawing β-b-111-A-2, part #1.
47H	Cable clamp	Aluminum Tinnerman series 8A, 6A.
51H	Bracket	Angle, steel, nickel plated. American Radio Hardware Co. Specify by ARHCO #. EXAMPLE: 51H6 = ARHCO #BKA-06.
60H	Neoprene	Gasket material, by thickness.
61H	Garlock 662	Gasket material, by thickness.
62H	Gasket	Neoprene, for H.V. cable clamp, by cable size, per drawing β-a-HVCC-4.
70H	Hole plugs	Non-ventilating, by diameter. Cinch Jones Ser. 141, or equivalent.
71H	Hole plugs	Ventilating, by diameter. Cinch Jones 41V or equiv.
72H	Spacers	Metal spacers, 3/8" O.D., #8 hole; ICA series 5764 through 68, or equivalent. Number after H represents length. EXAMPLE: 62H1 = Spacer 1" long per above, ICA #5768.
73H	Feet	Rubber, 7/8" diameter with #10-32 x 1/2" stud. Miller Products Co. #2102, or equivalent.
74H	Feet	Rubber foot, molded; #MB50, Miller series.
75H	Shock mounts	#10; base 2-1/2" square, 1/4" mounting hole, U.S. Rubber Co. #5150 or equivalent.
76H	Handle	Stanley #482J, number 2; unpainted; letter after H represents color, if any.
77H	Handle	Carrying; 4-1/2"; Precision Metal Products #2102, with mating end ferrule #2105.

Item number and letter designation	Type of Component	Description
77HF	Ferrule	Mating end Ferrule, Precision Metal Products; (Mates with handle #2102, 77H) (formerly 414E.)
78H	Handle	Leather carrying handle.
79H	Handle extension	For circuit breakers, Heinemann Electric Co. #GB-119.
80H	Chain	Bead chain, brass chromium plated, number after H designates manufacturers number.
81H	Coupling	Bead type "A" coupling standard, brass chromium plated. Number after H represents mfg. number.
82H	Outside portlights	Ganz #124, 5" diameter, opening-outside portlights. or equivalent.
1I	Lamp	Neon glow lamp, 117 V (nominal); 1/25 W, miniature bayonet base; NE-51, T-3-1/4 bulb. (Requires external resistor.)
2I	Lamp	Incandescent pilot lamp; #6S6; 115V, 6W; candelabra base; S6 bulb.
3I	Lamp	Incandescent lamp; standard Edison screw base. Numbers after I represent voltage and wattage rating. EXAMPLE: 3I 115 - 100 = 115 volt, 100 watt lamp, per above.
4I	Lamp	Neon glow lamp, 117V (nominal); 1W, double contact bayonet candelabra base; NE-32, G-10 bulb (requires external resistor.)
5I	Lamp	Incandescent pilot lamp miniature bayonet base; 6-8 volts, 0.15 amperes, brown bead. Bulb #T-3 1/4. G.E. #47 or equivalent.
6I	Screen	Viewing screen for βeta Model 701 portable projection oscilloscopes. Eastman Kodak Co. 11 x 14 1/2" rear Proj. Screen type 1 White. .130.
7I	Lamp	Neon glow lamp, 117V (nominal); 3W, standard Edison screw base; NE-40, S-14 bulb (built-in resistor).
8I	Lamp	Neon glow lamp, 117V (nominal); 1/4 W, candelabra screw base; NE-45, T-4 1/2 bulb (built-in resistor.)
9I	Lamp	Incandescent pilot lamp, 6-8 V, 15 C.P. double contact bayonet base, S-8 bulb.

Item number and letter designation	Type of Component	Description
1J-99J		NOTE: Any receptacle in this grouping mates with the corresponding numbered plug in the P grouping.
1J	Receptacle	1 contact, 97 3102-24-8S5S; mates with 1P (97 3106-24-835P)
2J	Receptacle	4 contact, 97 3102-14S-2S; mates with 2P; (97-3106-14S-2P)
3J	Receptacle	4 contact, 97 3102-18-4S; mates with 3P; (97 3106-18-4P)
4J	Receptacle	8 contact, 97 3102-22-18P; mates with 4P;(97 3106-22-18S)
5J	Receptacle	8 contact, 97 3102-22-18S; mates with 5P;(97 3106-22-18P)
6J	Receptacle	12 contact, 97 3102-28-8P; mates with 6P;(97 3106-28-8S)
7J	Receptacle	12 contact, 97 3102-28-8S; mates with 7P;(97 3106-28-8P)
8J	Receptacle	9 contact, 97 3102-28-1P; mates with 8P; (97 3106-28-1S)
9J	Receptacle	9 contact, 97 3102-28-1S; mates with 9P; (97 3106-28-1P)
50J	Jack	Banana, Birnbach 394 (giant); mates with 50Pa (Birnbach 396); or 50Pb (Birnbach 397).
51J	Jack	Banana; Birnbach 403 (medium); mates with 51P; (Birnbach #401).
52J	Receptacle	Power; Hubbell Twistlock 7556; 3 pole recessed male receptacle (motor connector); 125V, 15A; 250V, 10A; mates with 52P; (Hubbell #7555).
53J	Receptacle	Power; Hubbell Twistlock 7327; 3 pole recessed male receptacle (motor connector); 240V, 20A; 575V, 10A; mates with 53P; (Hubbell 7313).
54J	Receptacle	Coaxial; Amphenol, AN SO-239J; mates with 54P (AN PL 257).
55J	Receptacle	Power; Hubbell Twistlock 7408, 4 pole recessed male receptacle (motor connector); 250V, ac-dc, 20A; 600 V ac, 10A; mates with 55P. (Hubbell #7413.)
56J	Receptacle	Power; Hubbell Twistlock 7557; 3 pole recessed female receptacle, 125 V, 15A; 250V, 10A; mates with 56P. (Hubbell 7567.)
57J	Receptacle	Power, Hubbell Twistlock 7958; 3 pole, 4 wire, recessed male receptacle (motor connector); 250V dc; 50A; 600V ac, 50A; Mates with 57P (Hubbell 7764).
58J	Receptacle	3 prong socket. Jones #S-303-FP.
59J	Receptacle	10 prong socket. Jones #S-310-AB.
60J	Jack	Mallory #705, 1/4" junior jack; mates with 60P (Mallory plug #75).

Item number and letter designation	Type of Component	Description
61J	Jack	Mallory #JJ083, 3/16"; mates with 61P (Mallory plug #68)
100J	Receptacle	Power; Amphenol 61-M10 (male); 2 pole, standard plug, recessed male receptacle; 110V, 15A; 250V, 10A.
101J	Receptacle	Power; Amphenol 61-F1 (female); 2 pole, standard flush female receptacle; 110V, 15A; 250V, 10A.
102J	Binding post	Single connector, all metal; ICA type 620, or equiv.
103J	Binding post	Single connector, insulated; red ICA type 622 or equiv.
104J	Binding post	Single connector, insulated; black ICA type 623 or equiv.
105J	Binding post	Single connector, all metal; labelled "ground", ICA type 631 or equivalent.
106J	Binding post	1 pole binding post; EBY #37 or equivalent.
107J	Binding post	Single connector, 1 pole binding post, 5 way; 30A, 1,000 volts insulation; red; Superior Electric Co. DF 30RC.
108J	Binding post	Single connector, 1 pole binding post, 5 way, 30A, 1,000 volts insulation; black; Superior Electric Co. DF 30BC.
109J	Binding post	Two poles, National type FWG.
110J	Binding post	2 pole binding post, EBY #21R.
1K	Solenoid	115 volts ac coil; G.E. #CR 9503-208D.
2K	Solenoid	115 volts ac coil; G.E. #CR 9503-209C.
3K	Solenoid	115 volts ac coil; Soreng #EX-324-12100A.
4K	Solenoid	115 volts ac coil; Soreng #EX-358-12100A.
5K	Relay	115 V ac coil; double pole, double throw, 10A, 115 volts ac contacts; Leach type 1127 or equivalent.
6K	Relay	117 V ac coil; double pole, double throw, 10A, 115 volts ac contacts; octal plug-in socket base; Advance 964B-P or equivalent.
7K	Relay	1.5 milliampere dc, 2200 ohm coil; single pole, double throw; contacts: 1 ampere at 26.5 volts dc, 1 ampere resistive or .5A inductive at 115 V ac. Advance type SV1C-2200D.

Item number and letter designation	Type of Component	Description
8K	Relay	1/2 milliampere dc; 29,000 ohm coil; single pole, double throw; 110V ac contacts; Kurman type N220C44Y.
9K	Relay	115 volts ac coil; double pole, single throw, normally open, 15A, 115V ac contacts; Potter Brumfield PR7A.
10K	Relay	24 V ac coil; double pole, single throw, normally open contacts; 15A, 115V ac contacts; Potter-Brumfield PR7A.
11K	Relay	115 V ac coil; double pole, double throw, 15A, 115 volts ac contacts; Potter Brumfield PR11A.
12K	Relay	1/2 milliampere dc; 12,000 ohm coil; single pole, double throw; 110V ac contacts; Kurman type BK35.
13K	Relay	24 V ac coil; double throw, 15A, 115 V ac contacts; Potter-Brumfield PR11A.
14K	Relay	24 V ac coil; double pole, double throw, 3A, 115V ac contacts; Potter-Brumfield KR11A.
15K	Relay	110V dc coil; double pole, double throw, 8A, 115V ac contacts; Potter-Brumfield MR11D.
16K	Relay	110V dc coil; single pole, double throw, 8A, 115V ac contacts; Potter-Brumfield MR5D.
17K	Relay	115 volts ac coil; double pole, single throw, normally open, 10A. 115V ac contacts; time delay 5-20 second adjustable; Leach 1154-T, or equivalent.
18K	Relay	115 V ac coil; double pole, double throw, 2A, 115 V ac contacts; Allied type BJ6A115.
19K	Relay	Balanced relay; Coil (+7.5) - (0) - (-7.5) microamperes dc; contacts single pole, double throw, 5V dc, 200 ma, non-inductive load; Weston #534.
20K	Relay	1.4 ma dc, 8000 ohm coil; contact rating: single pole double throw, 2 A, 24V dc or 115V ac non-inductive load; Sigma type 4F.
21K	Relay	Contactor; 117 V ac coil; double pole; normally open contacts; 115V at 35A or 220 V at 25A; Mercury contacts Ebert Model #EM4.
22K	Relay	117 V ac coil; double pole, double throw, 5A, 115V ac contacts; dust cover; Octal plug-in base; Potter-Brumfield #KRP-11-1832 or equivalent.

Item number and letter designation	Type of Component	Description
23K	Relay	1.2 ma dc; 10,000 ohm coil; SPDT, 5A, 115V ac contacts; Potter-Brumfield LM5-1136.
24K	Relay	115V, 50/60 cycle coil; double pole, double throw, 3A; Potter-Brumfield KR-11A.
25K	Relay	Haydon time delay relay. 0-57 second adjustable; 125 volts ac, 15A contact rating. 115V, 60 cycles coil; Haydon #5901-2.
26K	Solenoid	115 volt ac coil; Soreng #6G12100A.
27K	Relay	Sensitrol relay, 1,000 ohm moving coil; 0-5 micro-amperes, 120V ac at 50 ma contacts with 110V, 60 cycle reset solenoid.
28K	Contactor	Allen-Bradley contactor; specify following when ordering: Bulletin_____, size_____, number of poles_____,_____ volts_____cycle coil; Catalog #_____.
1M	Meter	DC microammeter; 50 microamperes full scale; 4" square bakelite case; Simpson Model 29. Blank scale with βeta name and trademark.
2M	Meter	DC microammeter; 50 microamperes full scale; 3" square bakelite case; Simpson Model 27. Blank scale with βeta name and trademark.
3M	Meter	Weston Model 273 fan shaped meter; 7-1/3" scale length, 1% accuracy. See parts list for sensitivity and scale markings.
4M	Meter	Simpson Model 29 dc meter. 4" square bakelite case, (except 50 μa basic sensitivity). Specify for sensitivity and scale markings. EXAMPLE: 4M 0-1 MICROAMPERES DC = Simpson Model 29 meter, dial to read 0-1 MICROAMPERES DC; 0-200 μa dc sensitivity.
5M	Meter	Simpson Model 27 dc meter. 3" square bakelite case. Specify as per 4M.
6M	Meter	Simpson Model 57 ac meter. 3" square bakelite case. Specify as per 4M.
7M	Meter	Simpson Model 125 dc meter, 2-1/2" round bakelite case. Specify as per 4M.
8M	Meter	Simpson Model 155 ac meter. 2-1/2" round bakelite case. Specify as per 4M.

Item number and letter designation	Type of Component	Description
9M	Meter	Simpson Model 157 ac meter. 2-1/2" rectangular bakelite case; Specify as per 4M.
10	Caster	3" wheel, 1/4 ton swivel bearing; Darnell #3-73TDN; neoprene covered.
20	Caster	6" wheel, 1/2 ton swivel bearing; Darnell #4L06-RDN; neoprene covered.
30	Caster	4" wheel, 1/4 ton swivel bearing; Fairbanks #23-4MP; composition.
40	Caster	6" wheel, 1/2 ton swivel bearing; Fairbanks #23-6MP; composition.
50	Reductor box	400:1 ratio; 31 inch-pounds maximum torque; Boston #LW9.
1P-99P		NOTE: Any plug in this grouping mates with the corresponding numbered receptacle or jack in the J grouping.
1P	Plug	1 contact; 97-3106-24-835P; mates with 1J.
2P	Plug	4 contact; 97-3106-14S-2P; mates with 2J.
3P	Plug	4 contact; 97-3106-18-4P; mates with 3J.
4P	Plug	8 contact; 97-3106-22-18S; mates with 4J.
5P	Plug	8 contact; 97-3106-22-18P; mates with 5J.
6P	Plug	12 contacts; 97-3106-28-8S; mates with 6J.
7P	Plug	12 contacts; 97-3106-28-8P; mates with 7J.
8P	Plug	9 contacts; 97-3106-28-1S; mates with 8J.
9P	Plug	9 contacts; 97-3106-28-1P; mates with 9J.
50Pa	Plug	Banana, Birnbach #396; mates with 50J.
50Pb	Plug	Banana, Birnbach #397; mates with 50J.
51P	Plug	Banana, Birnbach #401; mates with 51J.
52P	Plug	Power; Hubbell Twistlock #7555; 3 pole female connector; 125V, 15A; 250V, 10A; mates with 52J.
53P	Plug	Power; Hubbell Twistlock #7313; 3 pole female connector; 250V, 20A; 575 V, 10A; mates with 53J.
54P	Plug	Amphenol, AN PL-259; mates with 54J.

Item number and letter designation	Type of Component	Description
55P	Plug	Power, Hubbell Twistlock 7413, 3 pole female connector; 250 V ac or dc; 20A; 600 V ac, 10A; mates with 55J. (Hubbell 7408).
56P	Plug	Power, Hubbell Twistlock 7567, 3 pole male connector; 125 V, 15A; 250V, 10A; mates with 56J (Hubbell 5557).
57P	Plug	Power, Hubbell Twistlock 7764, 3 pole, 4 wire, with equipment ground, female connector; 250 V ac, 50A; 600 V, 15A dc; Mates with 57J (Hubbell 7958).
58P	Plug	3 prong plug; Jones #S-303-CCT.
59P	Plug	10 prong plug; Jones #S-310-CCT.
60P	Plug	Mallory #75, 1/4" two way phone plug with tie cord anchor (Phenolic resin shell); mates with 60J (Mallory #705J).
61P	Plug	Mallory #68, 3/16"; mates with 61J (Mallory #JJ083).
62P	Plug	ICA #7577-1/4". (Mates with 62J).
100P	Tube cap	Alden 91 ISL.
101P	Tube cap	National SPP-3 steatite.
102P	Tube cap	National SPP-9 steatite.
103P	Tube cap	3/4" Johnson #124-315.
104P	Clip	Alligator, standard 2" size; ARH 45AT or equivalent.
105P	Clip	Battery; Mueller #27.
106P	Clip	Battery; Mueller #45.
107P	Clip	Battery; Mueller #48B.
1R	Resistor	Carbon or composition resistor; by resistance, % tolerance, watts. EXAMPLE: 1R 47/10/1 = 47 ohms, 10% tolerance, 1 watt. Any make, unless otherwise specified.
2R	Resistor	_____ohms, 5% tolerance, (Unless otherwise indicated by - - - suffix); 1/2 watt, precision, composition; Continental Nobeloy type X-1/2. EXAMPLE: 2R 2K = 5% tolerance; 2R 2K—1 = 1% tolerance; both 2,000 ohms nominal.

Item number and letter designation	Type of Component	Description
3R	Potentiometer	Standard linear potentiometer; wire wound or carbon; by resistance, material and wattage; nominal shaft. EXAMPLE: 3R 10W4 = 10 ohms, wire wound, 4 watts, any make.
4R	Resistor	High voltage; Resistance Products Co., by resistance in megohms, RPC type; and tolerance. EXAMPLE: 4R 1 BFQ 15 = 1 megohm, type BFQ, 15% tolerance.

RESISTANCE PRODUCTS CO. HIGH VOLTAGE RESISTORS.

TYPE	WATTS (in air)	VOLTS
BBF	1	3,500
BBM	2	7,500
BBR	3	15,000
BBV	5	30,000
BFQ	4	15,000
BFT	6	25,000
BFW	10	40,000
DPW	20	35,000
DPX	30	65,000
DVY	50	90,000
DZW	30	40,000
DZZ	90	125,000

5R	Resistor	Matched pairs; high voltage; Resistance Products Co.; by total matched resistance; individual RPC number, tolerance. EXAMPLE: 5R 1000 BFW 2 = Matched pair, 1000 megohms total, each resistor BFW, 2% tolerance of total resistance.
6R	Resistor	Power resistor_____ohms, (10% tolerance, unless otherwise indicated) _____watts, all wire wound. Any manufacturer, unless otherwise specified. EXAMPLE: 6R 1k5 = 1k ohms, 5 watts (if tolerance is other than 10% note as below. 6R 1k 5 - 1 (1%).
7R	Resistor	Precision, wire wound by resistance, precision, wattage. Any make, unless otherwise specified. EXAMPLE: 7R 2k/1/ 1/2 = Resistor, precision, wire wound, 2k ohms, 1% tolerance, 1/2 watt.
8R	Resistor	Precision, composition; by resistance, precision, wattage.

Item number and letter designation	Type of Component	Description
9R	Resistor	High frequency, Resistance Products Co. by resistance in megohms, RPC type; and tolerance.
10R	Potentiometer	Wire wound or composition potentiometer. For calibration purposes; linear taper, with screwdriver shaft, locking control, and MINIMUM RESISTANCE of approximately 10% maximum value. Clarostat Mfg. Co. series 43, 58, etc. By resistance, material, wattage. EXAMPLE: 10R 10k W 2 = Potentiometer, 10k, wire wound, 2 watts. 10R 10k C 1 = Potentiometer, 10k, composition, 1 watt.
11R	Potentiometer	General Radio type 371A potentiometer. Number after 11R designates ohmage. EXAMPLE: 11R 10k = General Radio type 371A pot, 10,000 ohms.
1S	Switch	Door interlock switch; single pole, double throw, 10 A 115 V contacts ac; Microswitch model 2AC1. Manually disabling and automatic reset type.
2S	Switch	Spring leaf switch; single pole, double throw, 15A, 115 V ac contacts; Microswitch type BZ-2RL-A2.
3S	Switch	Toggle switch; double pole, single throw, 3A, 125 V ac; screw terminals; Arrow-Hart & Hegeman #8965 or equiv.
4S	Switch	Toggle switch; double pole, single throw, 12A, 125V ac contact; Arrow-Hart & Hegeman #80600 or equivalent.
5S	Switch	Momentary pushbutton switch; 2 circuits; 1 - normally open, 1 - normally closed; BREAK BEFORE MAKE; 3 A at 125 V ac contacts with screw terminals; Arrow-Hart & Hegeman #3392A or equivalent.
6Sb,r	Switch	Momentary pushbutton switch; 2 circuits; 1 - normally open, 1- normally closed; BREAK BEFORE MAKE, 15A at 125 V ac contacts; G.E. #CR 2943-U-103C; or equivalent. b = black. r = red.
7S	Switch	Rotary selector switch; 2 poles, 2 to 5 positions; shorting; steatite insulation; Centralab #2504.
8S	Switch	Rotary selector switch; 4 poles, 2 to 5 positions; shorting; steatite insulation; Centralab #2514.
9S	Switch	Rotary selector switch; 4 poles, 2 to 5 positions; non-shorting; steatite insulation; Centralab #2515.

Item number and letter designation	Type of Component	Description
10S	Switch	Rotary snap switch; double pole; double throw, 3A, 125V ac; with screw terminals; A-H & H #1575 or equivalent.
11S	Switch	Rotary selector switch;___poles,___positions; (shorting, non-shorting); (ceramic, steatite) insulation. Manufacturing and number_____(see parts list for details).
12S	Switch	Knife switch; specify by number of blades, number of throws, voltage rating, current rating and manufacturer's number.
13S	Switch	Door interlock switch, SPDT, 15A, 150V ac contacts, manually disabling & automatic test type. Microswitch #1AC2.
14S	Switch	Microswitch (actuator with roller) #BZ-2RL-2.
101S	Circuit breaker	Heineman Cat.#0411TS, 60 cycles, 1Ø, 120V, curve 2. Number after S designates current rating.
102S	Circuit breaker	Heineman Cat.#0411TS, 60 cycles, 1Ø, 250V, curve 2. Number after S designates current rating.
103S	Circuit breaker	Heineman Cat.#0411CS, 60 cycles, 1Ø, 120V, curve 2. Number after S designates current rating. (This has terminal for shunting trip control).
	NOTE:	Any transformer with βeta number, ending in "0" represents the corresponding unit potted. Thus 100TO= transformer 100T β#20115, potted.
100T	Transformer	117V primary; Sec: 2 windings; each 1.3V at 0.3A; or 1.6V at 1.25A, or 2.6V at 5A (by means of PRIMARY taps.) Each winding insulated for 30 kv dc in air, 45 kv dc potted. β#20115.
101T DEAD	Transformer	115/2.6,2.6V at 5A; each secondary winding insulated for 65 kv dc; βeta #24211, for operation under oil.
102T DEAD	Transformer	117/5V, 6.5A; 30 kv dc ins., β#24511, air insulated.
103T DEAD	Transformer	Pri: 110/220V; Sec: 6.0V, 5A, 6.0V, 5A; one winding insulated for 150 kv dc; other winding insulated for 600V; βeta #201017; for operation under oil.
104T	Transformer	Pri: 110/220V; Sec: 6.0V, 4.0V; 150 kv dc ins., βeta #21313.
105T DEAD	Transformer	Pri: 110/220V; Sec: 6.0V, 4.0A; 300 kv dc ins., βeta #21314.
106T	Transformer	Pri: 110V, 50/60 cycles; tapped to give: Sec: 2 windings 1.6V, 1.25A; or 2.5V, 5A; or 5.0V, 10A each winding. 65 kv dc ins., operation under oil, 50 kv dc; βeta #24212.
107T	Transformer	Pri: 105/115/125/210/230/250V, 60 cycles; Sec: 6.0V, 5A; 300 kv dc ins., operation under oil βeta #21319.
108T	Transformer	Pri: 110V, 50/60 cycles; Sec: 13V, 7A; 150 kv dc insulation; operation under oil; βeta #21319.

Item number and letter designation	Type of Component	Description
109T DEAD	Transformer	Pri: 115V, 50/60 cycles; Sec: 2 windings; each 1.6V, 1.5A 35 kv dc insulation; operation under oil; βeta #20112.
110T	Transformer	Filament transformer; 110/220 volts in/6 volts or 6.5 volts at 5 amperes nominal; dual secondary by means of primary taps, 1 secondary 120 kv dc with voltage to ground; 1 secondary 400 volts dc working voltage to ground.
111T	Transformer	Pri: Dual winding 0-105/115/125 volts; Sec: 20V, 25A; Insulation: 500V dc working voltage; transformer to operate under oil; grounded copper foil shield between primary and secondary windings, insulated from this winding.
112T	Transformer	Pri: 0-105/115/125 volts; Secondary: 20V, 25A; Insulation: 300 kv dc working voltage; transformer to operate under oil; grounded copper foil shield between primary and secondary windings; insulated from this winding; βeta #230011.
200T	Transformer	Pri: 105/115 V, 50/60 cycles; Sec: 2.5 V CT at 10A, 1500 volts insulation; UTC #S-53 or equivalent.
201T	Transformer	Pri: 105/115 V, 50/60 cycles; Sec: 2.5V CT at 10A, 10,000 volts insulation; UTC #S-57 or equivalent.
202T	Transformer	Pri: 105/115 V, 50/60 cycles; Sec: 2.5V CT at 20A, 10,000 volts insulation; UTC #S-58 or equivalent.
203T	Transformer	Pri: 105/115 V, 50/60 cycles; Sec: 5/5.25 V CT at 22A, 3,000 volts insulation; UTC #S-60 or equivalent.
204T	Transformer	Pri: 105/115 V, 50/60 cycles; Sec: 10V CT at 10A,3000 volts insulation; UTC #S-62 or equivalent.
205T	Transformer	Pri: 110/220 V; Sec: 5V at 10A; 60 cycles; 15 kv insulation; General Electric #7470615 or equivalent.
206T	Transformer	Pri: 105/115 V, 50/60 cycles; 3 sec: 2.5V CT at 5A; 5 V CT at 6A; 300V insulation; UTC #S-59 or equivalent.
207T	Transformer	Pri: 105/115 V ac, 60 cycle input; Sec: 14 V CT, 11V CT at 10A, 5000 V insulation; UTC #S-63 or equivalent.
208T	Transformer	Pri: 105/115 V, 60 cycles; 3 Sec: 2.5 V CT at 5A; 5V CT at 6A; 3000 V insulation; UTC #S-64 or equivalent.
209T	Transformer	Pri: 105/115 V input, 50/60 cycles; 3 Sec: 2.5 V at 5A; 5 V CT at 4A; 6.3V CT at 3A; 3 kv insulation; UTC #S-65 or equivalent.
210T	Transformer	Pri: 105/115V, 50/60 cycles; Sec: 16.3 V CT at 3A; 7.5 V CT at 5A; UTC #S-68 or equivalent.
211T	Transformer	Pri: 105/115 V, 50/60 cycles; Sec: 6.3 V CT at 5A; 6.3V CT at 5A; 2 kv insulation; UTC #S-70 or equivalent.

Item number and letter designation	Type of Component	Description
212T	Transformer	Pri: 110V, 60 cycles; Sec: 5V at 10A; Freed Transformer #TF-7, CH80 case.
213T	Transformer	Pri: 117V, 60 cycles; Sec: 6.3 V ct, 1.2A; 2500 V rms insulation; Stancor #P-6134.
300T DEAD	Transformer	Pri: 115V; 3 Sec: 7.5 kv at 3 ma, low end grounded; 1.3 V, 2A, low voltage insulation; 1.3 V, 2A, high voltage insulation. βeta #00111.
301T DEAD	Transformer	Pri: 117V; 3Sec: 7.1 kv, 4 ma; start insulated for 11 kv dc, 1.3V, 0.3A, low voltage insulation; 1.3 V, 0.3A, tied to high voltage secondary end; βeta #00311; air insulated.
302T	Transformer	117/11,500 V at 4 ma; start of secondary insulated for 16 kv dc; βeta #20113; air insulated.
303T	Transformer	117/22,000 volts, 8 milliamperes; start of secondary insulated for 20 kv dc air; 30 kv dc potted; 60 kv dc, oil; βeta #21714.
304T	Transformer	Pri: 110/220 V; Sec: 44,000 volts, 8 milliamperes; start of secondary insulated for 75 kv dc; βeta #201042; for operation under oil.
305T	Transformer	Pri: 115 V, 400 cycles; Sec: 45 kv, 12-1/2 milliamperes rms; βeta #21342; start of secondary grounded.
306T	Transformer	Pri: 105/115/125 V, 60 cycles; Sec: 4 kv at 600 milliamperes rms; start of secondary insulated for 5 kv dc; βeta #204642.
307T	Transformer	Pri: 110/220V, 60 cycles; Sec: 12,500 V rms at 100 milliamperes rms; air or oil operation; βeta # 203041 (Old # β#24541).
308T	Transformer	Low voltage, high current transformer used in new LV series power supply, (formerly 227 series) listed by ac voltage and dc current. EXAMPLE: 308T 36-20 = 36 volt rms, 20 amperes dc.
309T DEAD	Transformer	Pri: 115 V, 60 cycles; Sec: 11,500 V at 6 milliamperes rms, 16 kv dc insulation at start of secondary; oil operation; βeta #20141.
310T	Transformer	Pri: 117 V, 60 cycles; Sec: 22,000 V, 20 milliamperes; 22.5 kv dc insulation, potted; βeta #210241.
311T	Transformer	Pri: 110V, 60 cycles; Sec: 90-0-90 kv rms at 25 milliamperes; nominal insulation; βeta #200742.

Item number and letter designation	Type of Component	Description
312T DEAD	Transformer	Pri: Terminal board, full secondary to primary shield; 0-115/125/140 V in, 5 kv rms out, at 3 ma dc from half-wave rectifier with capacitor filter, and also 5 kv rms at 3 ma rms; βeta #80941 (air insulated).
313T	Transformer	Pri: 117V, 60 cycles; Sec: 50,000 V rms, 100 milli-amperes rms; nominal insulation; operation under oil; βeta #805041.
314T	Transformer	Pri: 117V, 60 cycles; Sec: 110 kv rms, 100 milliamperes rms; nominal insulation; operation under oil; βeta #810041.
315T	Transformer	Pri: 110/220V, 60 cycles; Sec: 55,000 volts rms at 25 milliamperes rms; start of secondary insulated for 80 kv dc under oil; βeta #215041.
316T	Transformer	Pri: 117V, 60 cycles; Sec: 45 kv rms. Both ends of secondary insulated for 65 kv dc; under oil operation; for use in full wave bridge rectifier to deliver 60 kv, 40 milliamperes dc; βeta #206041.
317T	Transformer	Pri: 115V, 50/60 cycles; Sec: 7.5 kv rms, 3 ma; low lead insulated for 220 volts; βeta #800541.
318T DEAD	Transformer	Two primary windings; two secondary windings; symmetrical construction: Pri: 120V, with taps; Sec: 2.05 kv rms, 10 ma; 4.15 kv rms, 5 ma; 8.3 kv rms, 5 ma; 12.5 kv rms, 2.5 ma; using appropriate primary taps and secondary, low end insulated for 16 kv dc; air insulated; βeta #100041.
319T	Transformer	Pri: 117V, 60 cycles; Sec: 13.5 kv rms, 8 ma; start of secondary insulated for 16 kv dc air insulation; βeta #319T.
320T	Transformer	Pri: 117V, 60 cycles; Sec: 11,500 V, 14 ma rms, use in half-wave circuits; input circuit primary to take 140 V momentarily. βeta #210341. (This transformer to be potted only).
400T	Transformer	Pri: 115V, 50/60 cycles; Sec: 1000-750-0-750-1000 V rms at 300 ma dc; UTC #S-46 or equivalent.
401T	Transformer	Pri: 115V, 50/60 cycles; Sec: 1500-1250-1000-0-1000-1250-1500 V rms at 300 milliamperes dc; UTC #S-47 or equivalent.
402T	Transformer	Pri: 115 V, 50/60 cycles; Sec: 1500-1250-1000-0-1000-1250-1500 V rms at 500 ma dc; UTC #S-48 or equivalent.
403T	Transformer	Pri: 115V, 50/60 cycles; Sec: 2100-1800-1500-0-1500-1800-2100 V rms at 300 ma dc; UTC #S-49 or equivalent.

Item number and letter designation	Type of Component	Description
404T	Transformer	Pri: 115V, 50/60 cycles; Sec: 3000-2500-0-2500-3000 V rms at 300 ma dc; UTC #S-50 or equivalent.
405T	Transformer	Pri: 117V, 60 cycles; Sec: 525-425-0-425-525 V rms at 20 milliamperes dc; 5V at 3A; 6.3 V ct at 3A; 6.3 V ct at 3A; UTC #S-40 or equivalent.
406T	Transformer	Pri: 115 V, 60 cycles; Sec: 900-750-0-750-900 V at 200 ma dc; UTC #S-45 or equivalent.
407T	Transformer	Pri: 117 V, 60 cycles; Sec: 2500 V rms at 15 ma rms; Dongon Electric Co.
408T	Transformer	Pri: 117 V,60 cycles; Sec: 7.5 kv at 55 ma dc full wave doubler; Thordarson.
409T	Transformer	Pri: 105/115/210/220/240V; Sec: 7000-6000-4800 V ct at 300 ma dc; UTC #CG-307 or equivalent.
410T	Transformer	Pri: 105/115/220/230V; Sec: 7000-6000-4800 V ct at 1A dc; UTC #CG-309 or equivalent.
411T	Transformer	Pri: 105/115/220/230 V; Sec: 4800-2800-0-2800-4800 V ct at 300 ma dc; UTC #CG-305 or equivalent.
412T	Transformer	Pri: 117 V, 60 cycles; Sec: 2400 V at 5 ma dc; 2.5 V at 2A; 7.5 kv insulation; use in half wave doubler; Stancor #P-8151.
500T	Covat*	Single phase, hand operated Superior Electric Co. powerstat. Specify by Model, input voltage and output current rating. EXAMPLE: 500T20-115/3.5 = Superior Electric Co. Model 20 powerstat; 115/0-135 volts, 3.5A.
501T	Covat	Single phase, motor driven, Superior Electric Co. powerstat. Specify by Model, input voltage and output current rating. EXAMPLE: 501T 200B-115/1.5 = General Radio Co. Model 200-B variac. 115/0-135 V, 1.5A.
502T	Covat	Single phase, motor driven, Superior Electric Co. powerstat. Specify by Model, input voltage and output current rating, and rise time formaximum output voltage, from zero start. EXAMPLE: 502T MZ 1156-3P-115/135-6 = Superior Electric Co. Model MZ1156-3P powerstat; 115/0-135 V, 135 amperes, 6 seconds rise time.

* COVAT - COntinuously Variable Auto Transformer;i.e., powerstat, variac, etc.

Item number and letter designation	Type of Component	Description
503T	Covat	Three phase, hand operated Superior Electric Co. powerstat. Specify by Model, input voltage and output current rating.
504T	Covat	Three phase, motor driven. Specify by Model, input voltage and output current rating, and rise time for maximum output voltage, from zero start.
600T	Autotransformer	All 230 V in, 115 V out. Specified by volt-ampere rating. United Transformer Co. Series R41-R46 or equivalent.
601T	Isolation transformer	All 110/220 volts in, 110/120 volts out; specified by voltampere ratings. United Transformer Co. Series R72-77 inclusive. EXAMPLE: 71T40 = isolation transformer, 115/115 volts, 40 VA; UTC #R72 or equivalent.
602T	Isolation Step-down transformer	230 volts in, 115 volts out. Specify by voltampere rating. Stancor Series 6383-90 or equivalent. EXAMPLE: 602T 100 = Isolation stepdown transformer, 250/230/210/115 V, 100 VA; Stancor #6383 or equivalent.
650T	Transformer	Pri: 115V; Sec: 3 windings; 5.9 V, 1A; 16.3 V, 0.3A; 200 V, 50 ma; βeta #30112 (air insulated).
651T	Transformer	Pri: 115 volts, 50/60 cycles; Sec: 2 windings, 1.3 V, 0.3 A,low voltage insulation; 6.9 kv rms, 3 ma with 1.3 volt, 0.3A tap at high end; start insulated for 10 kv dc; air insulated; βeta #00341.
1V	Tube rectifier	Filament: _____volts,_____amperes; average plate current:_____milliamperes maximum; Inverse peak _____; Mfgr. and #_____.
2V	Tube rectifier	Filament:1.3 V, 0.3A; average current: 2 ma maximum. Inverse peak: 30 kv. Type 1B3.
3V	Tube rectifier	Filament: 1.6 V, 1.25A; average current: 2 ma maximum. Inverse peak: 60 kv; RCA type 5825.
4V	Tube rectifier	Filament: 2.5 V, 5A; average current: 20 ma maximum. Inverse peak: 40 kv; type 8013 or 8013A.
5V	Tube rectifier	Filament: 5V, 6A; average current; 100 ma maximum. Inverse peak: 40 kv; type 8020.

Item number and letter designation	Type of Component	Description
6V	Tube rectifier	Filament: 6.0V, 4.5A; average current: 2 5 ma maximum. Inverse peak: 140 kv; Dunlee type VR3B or equivalent.
7V	Tube rectifier	Filament: 5.0V,10A; average current: 250 ma. Inverse peak: 60 kv; Eimac type 250R.
8V	Tube triode	Multi-tron Laboratory #MTL 2C175.
9V	Vacuum tube rectifier	Filament: 6.0V, 6.8A; average current: 200 ma maximum. Inverse peak: 140 kv; Machlett type ML-41E.
10V	Vacuum tube rectifier	Filament: 6.0V, 4.1 A; average current 30 ma. Inverse peak: 160 kv; Eureka #EV3-75T.
11V	Vacuum tube rectifier	Filament: 6.0V, 6.8A; average current: 200 ma maximum. Inverse peak: 150 kv; Machlett type ML 48-E
12V	Vacuum tube rectifier	Filament: 6.5V, 6.0A; average current: 400 ma maximum. Inverse peak: 125 kv; Amperex type AVT-13E.
1W	Line cord	AC line cord; 6 feet long. 2 conductors, #18 gauge wire, stranded, consisting of 16 strands of #30 wire; neoprene insulation. Cornish Wire Co. #1462 or equivalent.
2W	Output cable	RG 8/U coaxial cable.
3W	Output cable	RG 17/U coaxial cable.
4W	Output cable	RG 19/U coaxial cable.
5W	Output cable	RG 59/U coaxial cable.
6W	Interconnecting cable	8 conductor, #16 stranded cable; rubber insulation on wires, neoprene outer jacket. See parts list for length.
7W	Interconnecting cable	12 conductor, #16 stranded cable; rubber insulation on wires, neoprene outer jacket. See parts list for length.
8W	Interconnecting cable	___ conductor,___stranded cable; rubber insulation on wires, neoprene outer jacket. See parts list for length. (XF1 is holder for fuse F1. NOTE: (XI3 is holder for lamp I3 (XV1 is socket for tube V1, etc.
1XF	Fuse holder	Buss type HKP fuse assembly, or equiv. (15A or less rating)
2XF	Fuse holder	Buss type HPC or equivalent, fuse assembly. (30A or less rating.)

Item number and letter designation	Type of Component	Description
3XF	Fuse Holder	Littelfuse #121002. Midget fuse clip.
4XF	Cartridge fuse cutout	Porcelain base cartridge fuse cutouts. Specify ampere rating, voltage, number of poles, main line or number of branches, if any, and Leviton catalog number. EXAMPLE: 4XF 60/250/ML/3/3907 = cartridge fuse cutout 60 amperes, 250 volts, main line, triple pole, Leviton #3907.
1XI	Pilot light holder	Dialco type 811308-437 assembly. Clear faceted lens, with built-in resistor (for I1 neon glow lamp.)
2XI	Pilot light holder	Dialco type 810B-43 assembly, or equivalent; no resistor in base (see parts list of jewel color).
3XI DEAD	Pilot light holder	Dialco type 4931-L-2 or equivalent.
4XI	Pilot light holder	Dialco type 51901-43 (see parts list for jewel color). (for 2I incandescent lamp).
5XI DEAD	Pilot light holder	Dialco type 95-4635-146 or equivalent (for 4I neon glow lamp.)
1XV DEAD	Tube socket	Plastic cleat lampholder; medium base; 250V, 660W; Monowatt #GE 1640-1 or equivalent.
2XV	Tube socket	Octal tube socket, bakelite insulation; Amphenol #77-MIP-8 or equivalent.
3XV	Tube socket	4 prong breadboard type; EBY 12-4.
4XV	Tube socket	4 pin, medium bayonet, steatite; Johnson Co. #123-210 or equivalent.
5XV	Tube socket	4 pin, standard jumbo, steatite; Johnson Co. #123-211 or equivalent.
6XV	Tube socket	Octal breadboard; EBY 12-8.
7XV	Tube socket	4 pin tube socket, bakelite insulation; Amphenol #77-MIP-4 or equivalent.
8XV	Tube socket	Ceramic cleat receptacle; medium base; 250 V, 660 W; Circle #226 or equivalent.
9XV	Tube socket	7 pin miniature, Amphenol #147-905.
10XV	Tube socket	9 pin miniature, Amphenol #59-406.

Item number and letter designation	Type of Component	Description
11XV	Tube socket	7 pin, giant wafer, steatite, Johnson Co. #122-237 or equivalent.
12XV	Tube socket	4 pin, super jumbo, steatite, Johnson Co. #123-206 or equivalent.
13XV	Tube socket	A two unit socket for "250 watt" tubes. Johnson #124-215, or equivalent.
1CR	Selenium rectifier	Half-wave section; 115 V ac in; 130V dc out; 100 ma; Federal Telephone and Radio #1004.
2CR	Selenium rectifier	Full-wave bridge; 115V ac in, 90V dc out; 750 ma; Opad-Green B6-750 or equivalent.
3CR	Selenium rectifier	Full wave bridge instrument rectifier; 5 ma dc maximum; Conant type 160-C.
4CR	Selenium rectifier	Germanium rectifier; type 1N34.
5CR DEAD	Selenium rectifier	Half-wave section, 456 V peak inverse, 500 ma dc maximum. Radio Receptor #6S2.
6CR	Selenium rectifier	Directron, 130V in/1 ampere dc out at approximately 100 volts dc; full-wave bridge.
7CR	Selenium rectifier	Half-wave section, Union Switch and Signal; by maximum dc current in milliamperes, type and maximum peak inverse volts. EXAMPLE: 7CR 2.5 - PF 1800 - 2.5 ma, type PF, 1800 volts maximum peak inverse. U.S. & S. S3Y50PF. TYPE: PF - Phenolic tube, ferrule end caps. GF - Glass tube, ferrule end caps. PL - Phenolic tube, axial end leads.
1TB	Terminal board	Jones barrier strips, Cinch Jones series 141; specify by number of contacts. (Tie points for interconnecting wires.) EXAMPLE: 1TB4 = Cinch Jones #4-141 terminal board.
2TB	Terminal board	Jones barrier strips, Cinch Jones series 142, specify by number of contacts. (Tie points for interconnecting wires.)
3TB	Terminal board	5 position; Precision Metal Products #2063. (mounting boards for small sizes circuit components.)
4TB	Terminal board	5 position; Precision Metal Products #2064 (mounting boards for small sizes circuit components.)

Item number and letter designation	Type of Component	Description
1VR	Electronic line voltage regulator	Input, 95-130 volts; output, 110-120 volts; regulation accuracy 0.1%. Specify by voltampere rating, which is also Sorensen and Co. Model #_____. EXAMPLE: 1VR 150 = regulator per above, 150 VA rating, Sorensen and Co. Model 150.
2VR	Electronic line voltage regulator	Input, 195-250 volts; output, 210-240 volts; regulation accuracy 0.1%. Specify by voltampere rating, which is also Sorenson Model #_____.
3VR	Magnetic line voltage regulator	Input, 95-125 volts; output, 115 volts; regulation accuracy 1%. Sola Electric Co. Series 30,000 or equivalent.. Specify by voltampere rating. EXAMPLE: 3VR500 = regulator per above, 500 VA rating; Sola Model 30808, or equivalent.

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